THE

physical therapy

REVIEW

Volume 33 - Number 12 December 1953

Evaluation of Strength and Motor Development in Infants, Part II – ZAUSMER

A Brace Fitting Chart – GLAUBITZ

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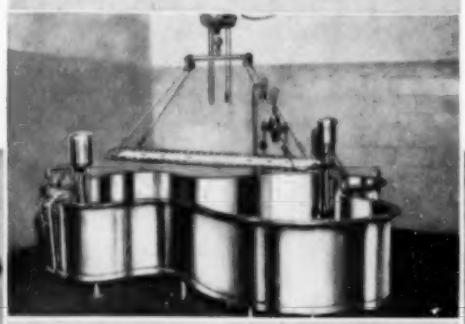

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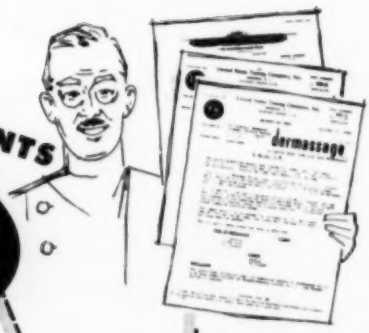

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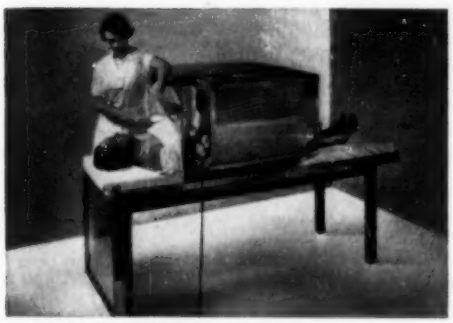

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THE physical therapy REVIEW

620 Vol. 33, No. 12

published monthly by the
American Physical Therapy Association
at 1790 Broadway, Room 1315
New York 19, N. Y.

Editor: E. JANE CARLIN

Associate Editors: SARA JANE HOUTZ, MARY E. KOLB, BEATRICE WHITCOMB

Managing Editor: CAROL VANCE

Membership in the American Physical Therapy Association is $15.00 a year, including a subscription to THE PHYSICAL THERAPY REVIEW. Subscriptions for nonmembers to THE PHYSICAL THERAPY REVIEW, $6.00 a year; $6.75 in Canada and foreign countries. Single copies 75 cents. (50 cents to members.) Reentered as second class matter August 11, 1949, at the post office at New York, N. Y., under the act of August 24, 1912.

The statements in the manuscripts published in THE PHYSICAL THERAPY REVIEW are made solely on the responsibility of the author. The American Physical Therapy Association does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in THE PHYSICAL THERAPY REVIEW are for exclusive publication and may not be published elsewhere without permission.

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The Physical Therapy Review

Official Publication of The American Physical Therapy Association

Vol. 33 December 1953 Number 12

Evaluation of Strength and Motor Development in Infants

PART II

Elizabeth Zausmer, Ed. M.

In the first part of the study some of the principles and theories dealing with normal and abnormal motor development in infancy were discussed.

The second part is intended to offer a number of hints and suggestions derived from practical experience in evaluating motor behavior and muscle strength.

Basically, the following technics have been used:

1. Restriction of voluntary motion; observation of reactions to such restraints.
2. Observation and analysis of motions based on reflex activities.
3. Observation and analysis of motor activities appropriate at various age levels.
4. Comparison of apparently abnormal range of motion in joints with average range of motion in normal infants.

Upper extremities

Most of the tests which are given to children to determine their mental, emotional, and social level of maturity are based on activities which involve the use of arms and hands, such as reaching for and manipulating objects and engaging in more or less complex forms of play.

In this study, manual activities are considered primarily from the point of view of *motor* development; their analysis serves to compare normal patterns with irregularity or impairment of muscle function.

From the first moment of his life a baby kicks about vigorously with his arms and legs and practically never, except in his sleep, keeps his extremities motionless. A normal, healthy baby strongly resists any attempt at restraint. Therefore, restricting his motion by holding his arms in unusual positions, such as extreme flexion over the head or diagnonally crossed over the body, has often helped in eliciting motion when voluntary movements could not be obtained.

Tickling the baby's face, slightly pinching his nostrils, blowing on his forehead, and other similar means of stimulation frequently result in an attempt to free himself from the source of irritation, thus using arms and hands. Such defensive acts should not necessarily be interpreted as voluntary movements. They may be but

Assistant Technical Director, Physical Therapy Department, Children's Medical Center, Boston; Lecturer on Physical Therapy, Simmons College.

Part I of this article appeared in the November issue.

primitive reflex motions on a subcortical level, but a child who lies passively and does not protest when parts of his body are pinched, tickled, or stroked, who does not try to free himself when his arms are held down at his sides, certainly shows a deviation from normal behavior. Obviously, it is possible that such behavior may not be due to motor disturbance, but rather to mental retardation, emotional difficulties, or other such factors.

During the first few weeks, the infant moves his arms in a purposeless and stereotyped way with shoulder, elbow, wrist, and fingers participating simultaneously. Single or isolated movements of any part of the extremity are rarely seen and coordinated movements cannot be expected before the age of four to six months. At first, these efforts seem to lack direction and intention. Usually both arms act simultaneously, reaching out for an object as one unit. Often the attempt fails because the flexor muscles of the arm still predominate at this stage, and the infant pulls his arm back, with the hand jerking toward his mouth. Only at a later date, approximately between the sixth and seventh months, do the extensor muscles of the arm gain sufficient motor control to allow for complete voluntary reach and manipulation of objects.

Studies have born out that in the first half year of life almost all infants are ambidexterous and show no preference for either right or left hand. Although there is still some difference of opinion whether handedness is a biological, social, or physical phenomenon, authorities seem to agree that environmental conditions and social demands influence at least to some degree the preference for one hand. Comparison of the movements of both extremities is, therefore, at this early age, of as much importance as the observation of the function of just one arm or hand; any discrepancy between functions on either side generally indicates a disturbance in motor development. If one arm or hand is preferred consistently to the other, and particularly if one extremity does not participate at all in activities, a central or peripheral injury of the nervous system is very likely to be the cause of this disturbance in motor function.

One of the earliest responses of the infant, grasping an object, is frequently misinterpreted. Many authors have investigated the grasp of infants and have come to the conclusion that a "grasp reflex" is present from the moment of birth. If an object is placed in the hand of a newborn baby, he grasps it in a paw-like fashion. This is entirely different from the voluntary grasp which develops later. As strong and active as the early grasp mechanism of a subcortical nature may be, it must be remembered that a normal baby's fingers can be brought passively into complete extension at all times. In contrast, abnormal strength of the finger flexors is demonstrated not only by an excessively strong grip but also by a limited range of passive finger extension. Absence of a fairly strong grip is frequently indicative of impairment of muscle power, possibly due to obstetrical paralysis, poliomyelitis, or other diseases of the neuromotor system.

During the first few weeks, the fourth and fifth fingers of a baby's hand are stronger than the index and middle fingers; he grasps with the whole palm and the wrist deviates to the ulnar side. Later, the index and the middle fingers become stronger, the grasp shifts to the radial side, the fingers close more actively. This radial palmar grasp usually can be observed before the thumb starts to take part in the motion of the hand.

The thumb is the last of the fingers to develop independent motion. At four weeks of age it is still of no practical use. Even at the age of three to six months, its only motion is that of flexion and extension. However, the child will grasp and hold objects in his hand by using these two motions. The opponens pollicis, taking the thumb through a semicircular movement into opposition, rarely functions before the age of eight to nine months.

Obviously, an understanding of the developmental stages is imperative for proper evaluation of the activities in which the young child engages at various age levels. The following table shows the average age at which the normal child is expected to master the listed activities:

Birth to 2 months: The hand clenches when an object is placed in it (reflex grasp).

4 months: Object is lifted and lowered. Touches, holds, knocks, and rubs an object with one or both hands.

5 months: Puts objects into mouth.

6 months: Splashes with hands in bath. Bangs object. Reaches with one hand for an object. May drop object from hand.

7 months: Begins to play with two objects, moves them separately. Knocks two objects together. Begins pressing and tearing objects.

8 months: Normal (radial) grasp.

9 months: Voluntarily shakes object. Transfers object from one hand to other.

10 months: Points with index finger. Prys into holes, explores objects (boxes, etc.).

11 months: Lifts and throws object (not much aim).

12 months: Scribbles on paper with large crayon. Puts one block on top of other. Tries to put on or take off shoes.

18 months: Builds tower of 3 to 4 blocks. Scribbles spontaneously. Throws objects with aim. Helps turn pages.

All these activities can be analyzed as to muscle strength and motor function. If such voluntary motions cannot be obtained, one will have to confine oneself to the observation of random movements, the evaluation of motor patterns based on reflex activities, and to the interpretation of the range of motion in joints.

Lower extremities

At birth and during the very first few weeks of life, the infant moves his lower extremities more actively than the arms and hands. This may seem to be contradictory to the law of cephalocaudal development which implies that at birth development is most advanced in the cortical region which controls the cervical spine and the upper extremities. This rather confusing motor behavior may, however, be explained on the basis of cortical inhibition. At this early age, the cortical regions which control the upper part of the body have matured sufficiently to permit some degree of inhibition of motion in the shoulder and arm while the cortical regions which control the motions of the trunk and lower extremities may not yet be sufficiently developed to inhibit random motions of the legs, which therefore occur more frequently.

At birth, the most advanced cortical development has occurred in regions which control the flexion mechanism; therefore, it is, not surprising to find that, due to this, as well as the intrauterine position, the very young infant retains for some time a characteristic preference for patterns of flexion of the trunk and the extremities.

Acute flexion of the hips and knees is the habitual position which the infant assumes when lying prone or on his back until he is almost four months old. The legs are outwardly rotated to such a degree that the lateral aspect of the thigh frequently rests on the bed. However, a healthy baby should show a normal range of passive motion in all joints of the lower extremities. His hips and knees can passively be flexed until the knees touch the chest and they can be extended fully, the entire posterior aspect of thigh and legs touching the surface.

The following table lists the average range of hip motion in infancy:

Hip flexion with knees bent: Knees can be brought to chest at any age.

Hip flexion with knees straight (straight leg raising):

Up to 6 months:	50 to 80 degrees
6 to 9 months:	60 to 100 degrees
9 to 24 months:	80 to 120 degrees

Hip extension:

Up to 3 months:	To neutral or possibly minus 10 degrees
3 to 9 months:	Neutral to 10 degrees hyperextension
9 to 24 months:	10 to 25 degrees hyperextension

Hip abduction:

Up to 6 months:	40 to 60 degrees
6 to 24 months:	60 to 80 degrees

Hip external rotation:

Up to 3 months:	60 to 90 degrees
3 to 9 months:	50 to 70 degrees
9 to 24 months:	40 to 60 degrees

Hip internal rotation:

Up to 3 months:	10 to 20 degrees
3 to 9 months:	10 to 30 degrees
9 to 24 months:	10 to 45 degrees

It is, therefore, of great importance to test the passive range of motion and not to confuse normal flexibility with unduly relaxed structures, or a normal limitation of joint motion at a certain age level with tightness or contractures.

Although the resting position of a young infant may be one of marked hip and knee flexion, he resists at all times the attempt to hold his knees passively flexed to his chest for a longer period of time, and it has been observed that he engages in strong hip and knee extension while trying to free himself from this restrained position. Absence of this reaction is a rather definite symptom that motor development is impaired.

During the first few weeks, movements of the lower extremities consist mostly of simultaneous hip and knee flexion, and to a lesser degree, of hip and knee extension. Characteristically, there is a rather jerky motion of bending the knees to the chest, followed by a jerky extension through about 45 degrees. Generally, both legs participate simultaneously although occasionally, one leg leads the movement. At the age of six to eight weeks, the infant usually begins to kick his legs alternately. Frequently, the trunk participates in the movement, bending laterally; the upper extremities often take part, too, in this general activity, expressing the need of the infant to move freely. Tickling of the feet will cause any normal baby to pull his feet toward his chest; absence of this reflex act is usually associated with neuromotor deficiency.

Hip extension can be tested by having the infant lie in the prone position with the legs hanging over the edge of the supporting surface. Tickling the buttocks or stroking along the spine (from the buttock upward) often stimulates the infant to lift the leg.

The "Righting Reflex," based on the baby's attempt to regain lost balance, may also be used occasionally for testing hip extension. The in-

fant is held up in mid-air in prone position, then lowered suddenly. He may respond to such a change of balance by extending his legs at the hips and knees and by holding them extended until the downward movement comes to a stop. Then, the hips will flex and the leg drop down to a right angle. This reflex reaction is lost after a few repetitions, and normally disappears entirely at three to six months of age.

Differences in the appearance of the buttocks are also definite symptoms of some existing abnormality. Careful examination should note inequality of size or muscle tone of buttocks and irregularity in the number or depth of gluteal folds.

Testing the hip abductors is one of the most difficult tasks since an infant rarely abducts his legs voluntarily. While it may sometimes be possible to palpate the abductors while the baby flexes and outwardly rotates his hips, this motion usually does not lend itself for an accurate evaluation.

It is possible, however, to again make use of the infant's desire to free himself from external restrictions. If the legs are adducted to the fullest possible passive range by crossing them over each other as far as possible, the infant will react vigorously by trying to pull them apart. Frequently, it is possible to observe and palpate abductor activity in this way.

The "Righting Reflex" may be used also as described in the test for extension, only changing the position to side lying instead of prone. As the child is lowered, the top leg will abduct.

Further evaluation of the abductors may be obtained as follows: The infant is held in a sitting position balancing on one knee of the examiner. Rather suddenly the baby is tilted to one side, as if letting him fall sideways. In an attempt to regain his balance, the infant abducts the top leg (the leg away from the side to which he is being lowered).

Although it is probably more difficult to evaluate hip abductor strength than any other muscle group, it should be possible to obtain at least an estimate of their function. Absence of any reaction to all of the technics mentioned here is likely to indicate some irregularity in the neuromuscular mechanism; however, it should be remembered that it is rather rare to find isolated weakness of hip abductors without other symptoms of abnormal motor behavior. Deformities such as hip adduction contractures, inward or outward rotation contractures, a higher pelvis on one side, pain or grating when the leg is moved, are only a few of the many symptoms which frequently accompany irregular patterns of hip abduction.

The inward and outward rotators of the hip are very difficult to evaluate in infants. The degree of passive range of motion is often indicative of functional capacity. Obviously, there should be no limitation to full passive motion in either direction.

Muscle strength of the knee extensors and flexors can usually be tested by offering resistance to the infant's kicking motions in back as well as in prone lying position. At the age of about six months, most children, when sufficiently motivated, enjoy touching or kicking objects with their feet. Activities such as crawling and creeping offer ample opportunity to observe knee motion. Obviously, the child's attempt at standing up yields also a great deal of information regarding strength and motor control of the musculature of the knee.

The feet of an infant are well formed; they are well developed and more flexible and mobile than they are at a later age. The muscles and ligaments are still soft and relaxed and allow for a wider range of motion than in later childhood. The fat pad on the baby's foot which gives the arch a flat appearance gradually disappears. The toes are held in flexion and active toe extension is usually not observed during the first few weeks of life. However, if the toes are stimulated by a pin prick, or if the sole of the foot is tickled, the great toe will extend while the other toes stay flexed. This phenomenon, the "Babinski Reflex," is a normal reflex in infants up to the age when they start to walk, but it disappears later with maturity of the spinal cord. If it persists after the age of about two years, it is considered an abnormal reflex, indicating a lesion in the central nervous system.

A baby tends to assume various positions of the feet which still fall within the variations of normal motor behavior; he may turn his feet strongly outward, thus giving the impression of pronation, or he may dorsiflex his feet to such an angle that one could suspect a calcaneus deformity. Since he may also turn his feet into marked supination, it is not always easy to distinguish between the natural, normal flexibility of a baby's foot and an abnormally increased range of motion.

One simple suggestion may help in determining whether a baby's foot can be considered normal or not. A certain degree of range of motion found in one direction should also be present in other directions; e.g., if the baby's foot can be dorsiflexed to 135 to 145 degrees, it con-

versely should go through a 30 to 40 degree range of plantar flexion, thus demonstrating very flexible but normal structures of the foot. On the other hand, the identical degree of dorsiflexion in another foot may be accompanied by marked restriction in plantar flexion, thus demonstrating abnormally relaxed heel cords and shortened anterior structures.

Most babies toe out to some degree when they first start to stand and walk. Normally, the height of the arch increases as muscles and bones develop by continued walking practice, and only at this stage will the foot of a child start to resemble that of an adult.

In early infancy bowing of the legs may be present, and this has been ascribed to the position of the child in the uterus. This bowing usually disappears before the child starts to walk. Some bowing of the legs or a slight knock-knee deformity may persist, however, even during the first few years of childhood without necessarily causing alarm. Bow-legged walking with accompanying shifting of the body from side to side indicates a more severe type of deformity, requiring this shift to prevent the knees from striking each other.

Rolling over, crawling, and creeping

The ability to roll over is the next step forward in the development of a complex motor behavior which started when the newborn baby wriggled and kicked his extremities, reflexly at first, and later progressed to purposeful movements.

Some infants learn first to turn from prone to supine position, others reverse the procedure and some infants learn both activities simultaneously. Rolling from the prone to the supine position is one of the most important phases of motor development; it is closely influenced by the preceding stages of development and relates to future phases, such as crawling and creeping. Abdominal muscles, back muscles, and practically all muscles of the extremities participate in the movement. A newborn cannot roll over voluntarily; however, when he finds himself in a position which allows the use of gravity, he may roll from back to side or from prone to side, or occasionally completely over.

The baby's first voluntary attempt at rolling over from supine to prone position may be expected at the age of three to four months. The infant turns his face to the side and pushes his head against the bed, but frequently, he cannot complete the movement and falls back to the starting position. A little later, at the age of about five to six months, he has realized that by crossing or throwing one leg over the other, he can work up enough momentum to turn himself over without much pushing of the legs and without the marked back extension.

The progression of rolling over from the prone to the supine position has been described by Gesell as follows:

The infant lifts his head (1 month)
The infant rests on knees, abdomen, chest (1 month)
The infant rests on knees, abdomen, chest, forearms (2 to 3 months)
The infant rests on thighs, abdomen, chest, forearms (4 to 5 months)
The infant rests only momentarily on abdomen and chest (5 months)
The infant rests only on thighs, lower abdomen, hands (6 months)

At this stage, the infant turns over voluntarily in contrast to previous attempts which may have by chance resulted in occasional turns.

An analysis of the muscles which participate in this pattern shows that posterior neck and back muscles are primarily involved in the movement of spinal extension; and the muscles of the forearm, particularly the triceps, participate in the push-off phase. The shoulder girdle must, in turn, be stabilized by the scapular musculature to permit lifting the chest, and the abdominal muscles are needed to clear the abdomen and hips from the bed. Hip and knee flexors come into play as the infant pulls the legs under his abdomen to shift his weight onto his knees, and hip and knee extensors engage in the final phase of pushing off which results in a complete turn. Inability to use any of these muscle groups may handicap the infant greatly in his attempt to roll over. It must also be remembered that unless there is sufficient motivation the child may postpone this act altogether if it proves too difficult. Therefore, additional encouragement and help are frequently needed to develop the latent motor capacities if a child is physically handicapped. Development of motor patterns and skills may thus take place in spite of existing physical limitations.

Crawling and creeping

Once the infant has learned to roll over, he usually advances fairly rapidly to the stage of motor development where he becomes dissatisfied with his stationary position and wants to move around and explore his surroundings more thoroughly.

The development in the infant's ability to crawl and creep proceeds again in an orderly and well defined way although, as has been pointed out previously, the speed and rate of progress may vary with each individual.

The terms "crawling" and "creeping" have

often been used interchangeably, but actually they are well defined separate stages of motor development. Certainly, from the point of view of muscular analysis, they are completely different activities. Diagnostically, it is frequently very important to observe in which type of propulsion the infant engages and why he prefers one type of locomotion to the other. Generally, it may be said that crawling is the stage of development preceding creeping when the infant's abdomen stays in contact with the surface on which he lies, while the body is pulled along mostly by the arms, with the legs still dragging. At the age of eight to nine months, an infant usually masters this activity. A great number of muscles participate in crawling. Posterior neck muscles enable the baby to lift his head off the surface, while trapezii, serratus, anterior and posterior deltoid, and triceps are involved in the motion of reaching ahead. The elbow and wrist flexors and extensors, as well as the muscles of the hand, come into play as the infant grabs an object in his attempt to pull himself forward. Often it can be observed that the infant engages in diffuse, squirming motions of the hips, legs, and feet which is an indication that the whole body participates in his effort to move forward. Although there are wide variations in the way a baby crawls (some propelling themselves forward, some crawling backward at first, some pivoting around themselves), there are certain abnormalities that can be spotted early. The baby who wants to crawl, but is unable to do so, shows his desire in facial expressions and squirming movements. He lifts his head from the prone position, his shoulders and chest are raised, he attempts to lift his arm over his head, but may not succeed; either he may lack strength in the musculature of the arms or hands to pull himself up, or the lower extremities may be too weak to propel the body forward. If there is marked weakness of the abdominal or trunk muscles, the infant will not demonstrate the wriggling and squirming movements which normally help in shifting at least part of the weight from one side of the body to the other. If an infant shows no desire to crawl at the age of about eight to nine months, physical defect, mental retardation, lack of stimulation, or other developmental irregularity may be the cause of such passive behavior.

The term "creeping" is used for the type of locomotion in which the body is raised on hands and knees. Creeping helps considerably in the development of shoulder girdle, trunk, arms and legs, and most babies creep spontaneously without prompting. The outstanding characteristics of creeping as compared to crawling is that in creeping the infant flexes his hips under his abdomen, thus lifting his buttocks. Many babies rise on their toes and hold their weight on hands and feet for a moment before settling back on their knees and then propelling themselves forward. Other infants rock back and forward on hands and knees for a considerable time before they attempt to creep. At the age of nine to ten months, most children creep well. The infant uses upper and lower extremities simultaneously, although the movement itself may still be arhythmic and somewhat jerky. Most frequently, opposite arm and leg move forward at the same time, the arm reaching forward while the opposite hip is being flexed. Inability to creep may be due to weakness in the shoulder girdle or the arms. If the arms are used normally but the knees are not drawn up under the abdomen, there is probably weakness of the abdominal musculature or the hip flexors. The hip and knee extensors are the most important muscles in the phase when the body is propelled forward, but even normal hip and knee musculature alone are not sufficient for creeping; the muscles of the foot which stabilize the leg against the surface and then participate strongly in the push-off phase are needed as well as the plantar flexors of the foot which help in propelling the body forward. Of course, locomotion is possible without these lower leg muscles, but it cannot be described as creeping. Weakness of any muscles of the lower extremities frequently results in the infant's attempt to pull himself forward with his arms only. If the arms are weak, he may be able to propel himself forward by pushing with the legs only. Certainly, weakness of the abdominal and back muscles prevents the baby from staying in any position where his trunk is raised up; he falls back on his stomach and may attempt to move forward by crawling.

In summarizing, it may be said that the majority of infants go through certain well defined progressive stages of crawling and creeping which are preparatory phases for sitting and standing. An infant who has missed any of these early activities cannot be expected to engage spontaneously in these more advanced types of locomotion or motor activity.

Sitting

In order to be able to come up to a sitting position and to maintain equilibrium in a free sitting position, the abdominal and back muscles must have reached a certain stage of maturation and strength; any abnormality in their function can be observed by a variety of symptoms.

Most infants start to sit up by rolling over from the supine to the prone position. They put their weight on their palms and knees and lift the trunk. At first, their abdomen may still touch the bed but soon they eliminate all unnecessary movements and lift themselves up by making a half turn and by pushing up on one or both arms. At the age of six to eight months, most children have eliminated the prone lying position and are able to come up directly from the back lying position to sitting by simply turning onto the side and by pushing up with one arm. At this age, the infant usually can sit with his weight supported on his hands, and he may even sit unsupported for a brief moment. His legs are outwardly rotated, the soles of the feet almost touching each other; his legs are abducted, frequently one knee is extended while the other is flexed, thus widening the base of support; gradually, he relies less and less on his arms to steady himself. A slight disturbance of his equilibrium will cause him to topple forward or sideward. A normal infant rarely falls backward from the sitting position. If an infant falls backward consistently from the sitting position, the cause may be found in spasticity of the extensor muscles of the back or in weakness of the abdominal or neck musculature. After the age of eight months, a tendency to sit with a markedly rounded back points toward weakness of the back extensors or mental retardation. Sitting with the weight shifted to one buttock, or with the trunk leaning to one side, always represents an abnormal pattern; it is most likely due to unilateral weakness of the trunk musculature, spinal curvature, or weakness of one leg.

Arching of the spine while attempting to sit up from the back lying position and inability to flex the trunk forward is most likely due to weakness of the abdominal muscles or stiffness of the back. Marked bulging of the abdomen, particularly if unilateral, deviation of the umbilicus to one side when the infant attempts to sit up, inability to cry loudly or to cough, are only a few of the many other symptoms which point to weakness of the trunk musculature. Proper development of trunk muscles is even more important in early infancy than in later childhood. Uneven pull of opposing muscle groups may be the cause for later deformities of the spine; early recognition and correction of faulty alignment of the trunk is likely to prevent more extensive damage.

Standing and Walking

Most children can take a few steps unsupported before they are able to get up from the floor by themselves. Even a very young infant can be pulled up to a standing position from sitting; he may even participate in the attempt by pushing down on his feet and straightening the knees, thus raising his buttocks off the ground, but his back usually remains arched and he cannot lift himself up completely.

At the age of nine to twelve months, the child uses any object within his reach to pull himself up. He rolls from supine to prone; he then pushes on his hands and arms, the chest and stomach are lifted off the surface. He flexes his hips and knees, then pushes off with his feet and raises his trunk. Later, the child omits the prone position altogether; from the sitting position, he carries his weight forward to assume the hand-knee position and then raises himself in the previously described way.

A child stands unsupported at the average age of seven to nine months. At first he places his feet wide apart; this gives him a broader base and helps to maintain his equilibrium. His hips and knees are usually flexed and often outwardly rotated. His feet are frequently turned out, and he may stand on his toes. The use of the toes in gripping the floor affords the much needed balance. This rather awkward posture is normal for a child who has just started to stand and has not yet acquired good balance; it must not be confused with faulty and abnormal neuromotor patterns. For example: the normal young child who frequently stands on his toes assumes this position only temporarily; generally, he rests his weight on his whole foot. In contrast, the infant who stands on his toes most of the time should be checked for symptoms of spasticity, presence of tight heel cords, or other deformities of the foot. The most commonly found deviations from the normal are: standing with the legs closely adducted or crossed; standing with a very wide base of support; standing with the trunk leaning to one side. Other symptoms of abnormality are: difference in the length of legs; difference in size or muscle tone of buttocks; difference in shape and size of hips; markedly increased lordosis.

There are wide variations in the progression of locomotion. Some infants skip the preparatory phase of standing, others go through a relatively long period of standing before they take their first step. A normal child, however, never needs to be taught how to walk. Even a newborn infant frequently engages in motions which are similar to walking; when he is supported in the upright position with his feet touching the surface, he engages in rhythmic alternate flexion

and extension movements of the legs. Obviously, these are only reflex and random movements, similar to the Moro and the suspension grasp reflex; there is no coordination between the lower extremities, upper extremities, trunk, and head. Walking requires the ability to combine functions and skills which the infant has gained previously. A child's postural adjustment becomes more deliberate and cortical inhibitory influence is evidenced by fewer reflex activities and increasingly coordinated motions of the extremitis and the trunk; however, the child may not yet have acquired sufficient control over the cortical centers which regulate balance and finer coordination and his movements may, therefore, still be jerky or propulsive.

At the age of about one year, the baby, using some support, cruises around sideways. In this way, he maintains a wider base and better equilibrium. The arms are usually extended and abducted for better balance. When the infant starts to take some steps forward, he keeps his feet wide apart; the hips and knees are flexed high; the foot does not participate in the movement at first. He may either plant one foot firmly ahead of the other and pause before lifting the other foot forward, or he may take small, quick, or even running steps and then stop suddenly or fall. When better coordination has been achieved (usually at the age of from twelve to fifteen months), the child begins to walk in heel-toe progression; the ankle and foot participate now in the stepping movement.

Failure to stand and walk at the expected age level should not always be attributed to some defect existing at the time of the examination. It may well be due to irregularities during previous stages of motor development. The cause of such retardation, which may even have been overlooked at the time, may since have disappeared. All too often we are inclined, as Rand points out, to "think of walking as a function established and complete in a fairly brief space of time at the close of the period of infancy; we fail to realize that as a skill it begins as training in early infancy with the stretching and wriggling which teach coordination and strength to all muscles of the body; nor do we as a rule understand that progress in perfection of the skill of walking extends throughout the entire period of childhood. Before the child walks, he must have experienced a long prerequisite training in coordination and strengthening of the muscles which begins as early as the third or fourth months and continues well past the two-year level."

Experience shows that there are many atypical patterns of gait in early infancy and that it is frequently difficult to know whether they are really abnormal or not. Therefore, the following deviations from the usual gait of a young child should be observed and evaluated carefully.

Limping of any kind is abnormal at all age levels. In normal gait, the steps are equal in length and rhythm; when limping, the child may take a longer step with one leg than the other, or he may stay on the weaker leg for a shorter time than on the stronger one. Limping may be due to a number of abnormalities, such as weakness of the musculature of the leg or foot, inequality of length of legs, sensitivity or pain in any of the weight-bearing structures, etc. At no time does the normal child drag one leg behind the other; inward rotation of the hips and legs also indicates some abnormality; tightly adducted or crossed legs are definitely abnormal at all age levels. Exaggerated, jerky body movements, often associated with tremor of the extremities and uncoordinated, purposeless movements of the arms, are found in children suffering from extrapyramidal tract lesions. A reeling, staggering type of gait may be due to a lesion in the cerebellum, causing lack of coordination in the participating muscle groups.

As pointed out before, the infant does not always show a well integrated motion of ankle and foot when he starts to walk. Frequently, he scarcely moves his ankle and foot, and often he puts his whole sole down as his foot strikes the floor. He may supinate or pronate his feet during the first few weeks of walking. It can be noted, however, that the normal child does not consistently use only one of these seemingly abnormal motor patterns; he may take several steps with his ankle held stiffly and his foot not participating in the motion; but then he may also take several well coordinated steps; or he may supinate while taking a few steps and then again keep his feet pointing straight ahead.

Thus, it should be possible to differentiate between an infant who shows only individual variations, or possibly slight temporary deviations, from the average pattern of locomotion and the abnormal infant who shows some organic defect, a true deformity, or definite retardation in motor development. While the latter requires medical attention, the former needs proper understanding and guidance. Such a child will in due time catch up with other children of his age; he will, without any permanent defect, leave behind the primitive crawling stage and become a "homo sapiens erectus."

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A Brace Fitting Chart

Alfons R. Glaubitz

When the physical therapist has a patient, old or young, under his training program, the proper length of the brace worn by the patient is of great importance. The continuous growth of the child will necessitate the lengthening of the brace more often. If this is not done, or overdone, it will cause the patient undue hardship. Too often when the child has outgrown his braces between the knee and sole of the foot, the lengthening is done incorrectly between the knee joint and trochanter joint of the brace simply because there was enough lengthening facilities in the latter.

A widespread knowledge of the cause of many brace misfits is therefore in order. One must know why the calf band, though made to proper size, is tight in the sitting position and binds the calf muscles. It is equally important to know the reason why the heel of the foot tends to come out of the shoe even though the brace is considered of the proper length. Pain in the knee joint itself may be experienced in traumatic or arthritic cases when a brace is fitted too long or too short.

The anatomical knee joint is a sliding joint and its orbit cannot be duplicated with a single axis joint as the one we find on most leg braces. The devised fitting chart is based on the knowledge that when the knee brace joint is not placed close to the center of the orbit of the anatomical knee joint of the leg, a malpositioning of the calf and thigh band will result.

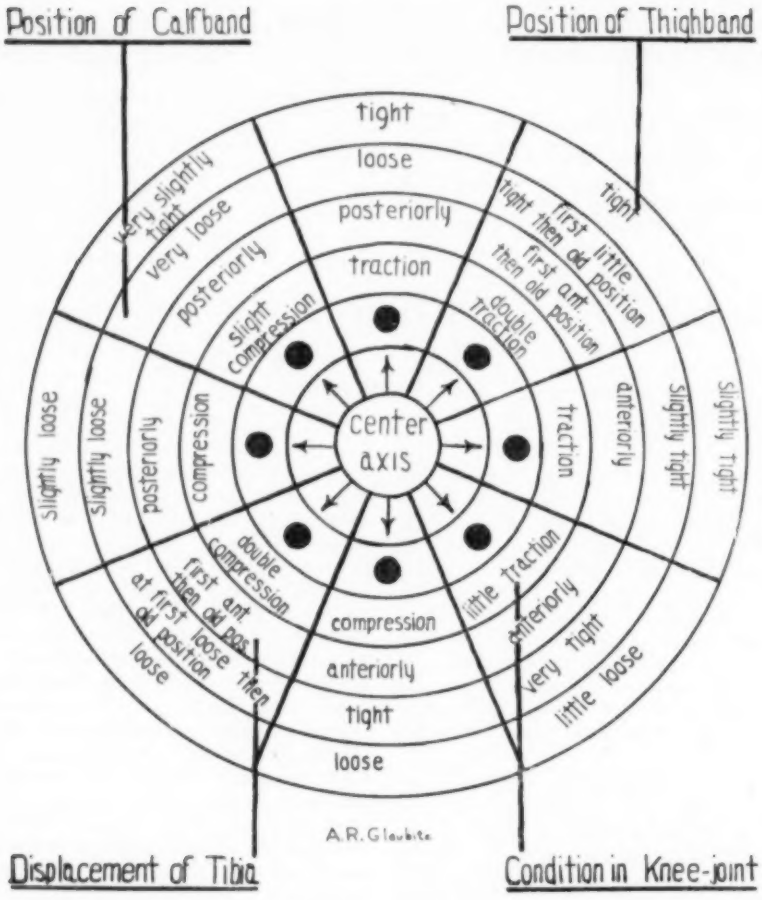
With the leg in extension the thigh and calf band of the brace have no shifting influence on the limb. If, however, the knee is flexed, the directional shift of thigh and calf band will take place when the brace knee joint is below, or above, or in front, or back in relation to the anatomical joint.

In reading the chart, it should be noted that all results are given with the braced leg in 90 degree of flexion. The black dots represent the possible malpositions of the joint of the brace while the center axis represents the anatomical knee joint. The four concentric circles represent the common fitting problems that occur. As indicated in the chart, the innermost circle will give the conditions found at the knee joint, the next circle the tibial displacement, the next circle the calf band position, and the outer circle the thigh band position. Thus, by identifying either the fitting errors of the above four brace parts or by recognizing the incorrect brace joint axis, the corrections can be easily determined.

USE OF THE CHART

The black dot below the center axis represents the axis position of a brace which is short between the knee and the sole of the foot. The action of the thigh and calf band on the braced leg, in flexion, is written into the segment of the circle. It will be noticed that the thigh cuff is loose on the leg and the calf band tight. The calf band by its tightness on the calf has the tendency to move the tibia forward. Because of the looseness of the posterior surface of the thigh, the thigh cuff will appear to be tight and will cause a downward compression of the knee joint surface. By merely loosening the laces of the thigh cuff, the space between the posterior thigh surface and the thigh cuff will be noticed. The lengthening of the brace between knee and sole

Orthotist, Crippled Children's Hospital, Elizabethtown, Pennsylvania.



BRACE FITTING CHART

of the foot is then determined by the space found between the posterior surface of the thigh and the thigh cuff.

The dot located above the center axis represents a misplaced brace knee joint above the anatomical center axis. Too often braces are lengthened in excess to permit the patient to grow into it. Before the patient has grown into the brace, however, the following will happen. In flexion, the thigh cuff of the brace will bind on the posterior surface of the thigh, causing a great deal of pressure to the hamstrings. This is especially annoying to a cerebral palsied child. This upward surge of the thigh cuff is resporsible also for lifting the foot out of the shoe.

The calf band, it will be noticed on the chart, is loose. This condition in conjunction with the tightness of the thigh cuff should make one aware that the brace is too long between the knee and the sole of the foot. While we had an anterior misplacement of the tibia with a compression in the knee joint surface, in a brace too short for the patient, the opposite takes place here. The lacing of the calf band will force the tibia backwards, and the tightness of the thigh cuff on the posterior surface of the thigh will cause traction to the knee joint surface.

The next misplacement of the brace knee joint is the one located in front of the center axis. The average brace bar below the knee is formed for a well developed calf and its side contour matches that of the calf of the leg. There are

instances however, where the calf muscles severely atrophied. Application of such a well formed bar to a formless calf will result in the misplacement of the brace knee joint anteriorly to that of the center axis. This anterior misplacement of the brace knee joint will cause the thigh and calf bands to become loose. Of course, we are assuming that the thigh bar of the brace was made to the correct measurement of the patient's length between the knee joint and the trochanter joint and that pelvic band holds the leg in place. Posterior movement of the tibia is caused by the lacing of the calf band and the compression in the knee joint surface is exerted by the thigh cuff moving away from the posterior surface of the thigh. The possibility that a brace with pelvic band, which is made longer than the measurement of the patient's actual length between knee and trochanter joint, cannot be overlooked as the cause of a tight calf band.

Conversely the following action will take place when the brace knee joint is posterior to that of the center axis. The cause: a straight brace bar below the knee, fitted to a well developed calf muscle. If the thigh bar in this instance is made to the actual length of the distance between the patient's knee joint and trochanter joint, the position of the posteriorly located brace knee joint will have to move to front when flexed, due to the anchorage of the pelvic band to the body. Under the above condition, only the calf band can move forward forcing the tibia anteriorly while the upward motion of the thigh cuff exerts traction on the knee joint.

The intermediary misplacement of the brace knee joint between the four mentioned positions has more of an effect on the knee joint surface and the tibia and is a clue to determine the proper length of the brace. The importance of these relative alignments is more apparent to the surgeon in his plaster work, or when compression or traction in the knee joint, or a change of the position of the tibia is deemed advisable. The competent orthotist and prosthetist will use this knowledge in the construction of artificial limbs, or specialized orthopedic appliances.

When checking the patient for the proper length of the brace, the brace must be free of the knee cap and the strap, and lacing of the pelvic band disengaged when the patient is sitting in an upright position. The proper distance between the trochanter and brace knee joint is then readily noticed.

Meet Our New Contributors

Mary Eleanor Brown, M.A., Director of Physical Therapy, Department of Physical Medicine and Rehabilitation, Bird S. Coler Hospital, Welfare Island, New York City, is not a new comer to our publication. She has been closely connected with the development of programs for the rehabilitation of the disabled, beginning with her work at the Institute for the Crippled and Disabled in 1941.

Miss Brown received her B.A. degree from Barnard and her M.A. in physical education from New York University. Her physical therapy certificate was granted by New York University.

Alfons R. Glaubitz, Orthotist, Crippled Children's Hospital, Elizabethtown, Pennsylvania, completed his apprenticeship and training in Germany, where he was awarded his master degree in bracemaking from the German Orthopedic Trade Commission.

Upon his arrival in the United States, Mr. Glaubitz was employed by a large surgical and orthopedic appliance company in New York. In 1939 he established the brace shop at the Crippled Children's Hospital in Elizabethtown. In addition to his duties as head of this department, Mr. Glaubitz lectures on the scientific principles of the construction of orthopedic appliances and their proper use and is associated with several orthopedic clinics throughout the state.

Mr. Glaubitz, who has contributed articles to a number of publications and books, is a member of the National Advisory Council to the American Board for Certification of the Orthopedic Appliance and Limb Manufacturers' Association.

Katherine I. O'Neill, Supervisor of Physical Therapy, Visiting Nurse Association, Baltimore, Maryland, received her physical therapy preparation at New York University where she completed requirements for her physical therapy certificate and later a certificate in public health. Miss O'Neill also studied at Johns Hopkins University.

She is a member of the American Physical Therapy Association, the American Nurses Association, and the American Registry for Physical Therapists.

Moira M. Ward, R.N., Acting Director, Rehabilitation Nursing, Sunnyview Hospital, Schenectady, New York, received her nursing preparation at the New York Hospital Nursing School and enrolled at Teachers College, Columbia University, and New York University for special study.

Since 1943, when she accepted the position as assistant therapist and nurse at the Institute for the Crippled and Disabled, Miss Ward has been interested in orthopedics. In 1946 she assisted Miss M. E. Brown in organizing the West Haverstraw Rehabilitation Department and prior to her present affiliation, she was Public Health Nurse with Special Skills, Association for the Aid of Crippled Children, New York City.

Miss Ward is a member of the New York State American Nurses Association and of the New York State League of Nursing.

*Toilet Problems of Seven Children with Spina Bifida**

Mary Eleanor Brown, M.A., and Moira M. Ward, R.N.

It all started with finding 8 year old Jean Irene, born with a spina bifida, in a special class for cerebral palsied children, and witnessing the disappearance of her precious rehabilitation time as her physical therapist changed her diapers. Twenty minutes out of thirty scheduled were needed to change the diapers, as the child, encased in her braces, was lifted onto a table, braces removed, diapers disposed of, body washed and powdered, clean diapers applied, and braces replaced — outright custodial work at the expensive rate of at least $2.00 per hour. As our interest in Jean Irene's bladder and bowel rehabilitation became known, six other children with spina bifida were referred to us, and a project evolved to explore the total rehabilitation possibilities of children with spina bifida, focusing especially on their toilet problems. We are reporting this project from the standpoint of practical toilet activities, their attendant problems, and suggestions for solving some of them.

The project covers the 22 month period from April 10, 1951, to February 13, 1953, the date of the first admission to the date of the last discharge. The project was possible through the participation of the following rehabilitation team members: superintendent, parents, child, social worker, bedside nurse, orthopedist, neurologist, urologist, rehabilitation nurse, physical therapist, occupational therapist. It took place at Sunnyview Hospital, Schenectady, New York. The seven children with spina bifida are residents of up-State New York. Four are girls, three boys. All spina bifida's are in the mid- and low back. All have neurogenic bladders. The ages as of the first day of the project were from four years three months to fourteen years one month. The intelligence quotients range from 114 to 57. Ages and psychological status are shown in the table.

From the Eastern New York Orthopedic Hospital-School, Inc. (Sunnyview), Schenectady, New York, under the medical direction of William E. Gazeley, M.D., Jacob Frumkin, M.D., and with the assistance of Elinor Vitelli, R.N. Miss Brown, no longer at Sunnyview, is Director of Physical Therapy, Department of Physical Medicine and Rehabilitation Bird S. Coler Hospital, Welfare Island, New York City..

* This is an abbreviated report of the article entitled "Diapers to Dry Days: Toilet Problems of Seven Children with Spina Bifida," which was read at the Research Section of the Annual Conference of the American Physical Therapy Association, Dallas, Texas, June 1953.

The Problem

Annette, the oldest, did not go to the bathroom except for bowel evacuation. She had no control of her bladder and no schedule for changing her clothing. So she sat day in and day out in ill-smelling diapers. Her only way of moving about was crawling on the floor or on her tricycle, for she was unable to stand. She had never gone to school, but had a home teacher.

Jean Irene, too, had to wear diapers, but, in spite of them, she got soaked from skin out, and every day was wash day for her mother! She also wore long double leg braces with a back brace attached, and her physical therapist was spending 67 per cent of the time set aside for rehabilitation (19 hours out of a scheduled 28½ hours) changing the diapers and replacing the braces each time.

Richard had never in his life had a natural bowel movement. He had to have an enema every other night. Because he could not retain any of the enema water, his mother prepared ten enema bagfuls, and he had to jump into the bathtub for this degrading and time-consuming ritual. To add to his mortification, this young 10 year old boy could not go to the bathroom normally by standing up to empty his bladder. Not that he couldn't stand up. Fortunately, he could, but his bladder didn't fill up the way it should, had no storage capacity, so he "leaked" all the time and had to pad himself. He never went to the bathroom in school for fear the other boys would see him, and went home at lunch time to change.

Then there is 5 year old Jeanne Elizabeth, who had her bathroom troubles. Positions on bedpans and toilet seats the right size are so important to all young children being toilet-trained. She wore braces with no knee joints, so her sitting position itself defied bladder and bowel function.

"Dolly," our other 5 year old, came to us because of an ulcer on her foot. She brought with her many "temper tantrums," refusing to

Children	*Birth Date*	*Psychological Status*	*Admission Date*	*Age at Admission*	*Discharge Date*	*Age at Discharge*
Annette	3/9/37	3/20/52 1937 L Binet CA 15–0 MA 10–8 IQ 79	4/10/51	14–1	3/28/52	15
Jean Irene	7/12/41	1/10/50 1937 L Binet CA 8–6 MA 8–2 IQ 96 (+)	7/17/51	10	3/28/52	10–8
Richard	1/24/41	2/27/50 Kullman Anderson IQ 107	10/23/51	10–10	4/19/52	11–2
Jeanne Elizabeth	5/17/46	9/17/51 1937 L Binet CA 5–4 MA 6–1 IQ 114	12/16/51	5–7	8/26/52	6–3
Peter	12/6/45	10/21/52 1937 L Binet CA 6–10 MA 4–0 IQ 59	2/20/52	6–2	2/13/53	7–2
Dolly	12/30/46	11/25/52 Pintner-Cunningham CA 5–11 MA 5–5 IQ 92	6/20/52	5–5	11/1/52	5–10
Robert	11/17/43	11/25/52 WISC CA 9–1 Verbal IQ 57 Performance IQ Too low to score Full IQ Too low to score	Cancelled: Never admitted as in-patient because sum total medical, therapy and psychological information indicated no possibility of rehabilitation; follow-up of child and practical help to mother through out-patient clinic.	7–5 (as of 4/10/51)		

Table showing age and psychological status of each child.

eat and also wetting her clothes more than usual for which behavior she was being reprimanded, as it was believed that these lapses were deliberate.

All these children wore diapers, except Dolly who should have, never had a dry day in their lives, had itchy chafing skin due to the constant wetness, didn't know how it felt to go to the bathroom normally, knew nothing about the signals others take for granted, often smelled of urine, had to have frequent enemas, laxatives and cathartics, were dependent on others for their toilet activities, faced an adulthood filled with annoyance, discomfort, bafflement at the reasons why they were not like others. . . . Such are the problems of children with spina bifida.

EVALUATION AND REEVALUATION

Evaluation was the basic theme in planning their rehabilitation. All the children were exhaustively evaluated, to the extent the hospital services allowed, before they were subjected to further study. The four main evaluation sources were: social, medical, psychological and school, and motor. Previous hospital records were obtained and the information supplemented by bowel, bladder and kidney examinations by the urologist to establish organic status, and neurological, orthopedic, and physical examinations.

Tabular and graph materials, impossible to reproduce here, have served as a basis for extracting the practical points gained from the detailed information collected. The largest table has nineteen columns and covers essential information for the study of the toilet problems of the seven children who are listed vertically. The first eleven columns give name, sex, birth date, diagnosis, level of involvement, psychological status, admission date, age at admission, discharge date, age at discharge, and number of days in the Hospital. The last eight columns give a résumé of the evaluation information obtained with special reference to toilet activities. The information falls under the following headings: disability; incontinence protection; management of protection; toilet activities from daily activity records; locomotion status, braces and other aids; bladder; bowels; school status.

Two of the procedures used were graphed on a

daily basis. (These were drugs and exercise.) The graph permitted the use of "Pre-Graph" for initial evaluation information and "Post-Graph" for the reevaluation results.

Thus the table allows horizontal study of each child, as well as vertical study of each heading. The complete manuscript, of which this is an abbreviated report, summarizes vertical information by discussing: (1) the pre-graph evaluation results, (2) the post-graph reevaluation results, and (3) methods. By this scheme, procedure is interjected under each heading in the manuscript discussion, rather than in a separate procedure section. In brief, the methods of attack on the toilet problems were: devising better protective materials; drilling in all daily activities associated with the toilet, so as to develop independence and speed; employing orthopedic measures to allow weight-bearing and best body mechanics with minimal yet efficient bracing; and conducting bladder and bowel function studies.

BLADDER AND BOWELS

Bladder: Evaluation; Reevaluation

With regard to the function of the bladder, the following factors stood out as worthy of comparison before and after the project:

1. The presence of signals or warnings that the bladder was ready for emptying, and a description of them if possible.
2. The voiding habits of each child.
3. The number of dry days.
4. The amounts voided if any and if known.
5. Drugs (Ephedrine sulphate and banthine were used).

A study of the vertical information shows pre-graph bladder evaluation to be as follows:

> Three children had bladder signals but did not use them. Only one used the toilet for urination or had any voiding habits at all. All but one took for granted that diapers had to suffice. None of the children had any dry days. None could report how much measurable urine had been expelled at once. All were wet and ill-smelling most of the time.

Post-graph evaluation yielded the following:

> Improvements have been shown in the bladder function of four of the children, all of whom have signals and use them. Voiding habits have been established in the same four children. Three of these have had dry days in a row: one, 13; another, 7; and a third, all. Ounces voided for these three children are as much as 4½ for the first, 5 for the second, 12 for the third. Drugs are used only by one. The bladder function of one is essentially normal.

Bowels: Evaluation; Reevaluation

Following a similar pattern in the case of bowels, our evaluation was based on two items: (1) signals and (2) evacuation. Summarizing vertically, pre-graph bowel status was as follows:

> All but one had bowel function impairment. Two reported signals but did not use them. No attention was paid to regularity in the case of five of the children. Combinations of laxatives, cathartics, and enemas were given freely when movements did not occur. No attention was paid to diet. One child has always been incontinent several times a day and night; incontinence was infrequent with the others.

Post-graph bowel status is as follows:

> The improvements in bowel function are also marked. Three children developed their signals and used them. No more enemas for anyone; laxatives and cathartics less often for all. Two children eat roughage diets. One child has acquired normal bowel function.

Bladder and Bowel Daily Record

So much for the "before" and "after" information. In order to keep track of the function of bladder and bowels, a bladder and bowel daily record form was drawn up and mimeographed. Forms allow recording at any time. This is a 24-hour one, going from midnight to midnight. Therefore, beginning with 12 midnight, the space downward along the width of a standard 8½ by 11 inch typewriting-size mimeograph sheet is divided into 24 spaces. Crosswise, the form allows for entering the hour; "wets" and "drys"; information as to signals; intake and output, including liquids, solids, meals and medicine; exercise and other activities. Copies of the mimeographed forms may be obtained from Sunnyview Hospital.

PANTIES

Five out of the seven once-diaper-needing children now wear the plastic-lined self-help panties made to individual measurement (see figure 1). These panties protect against incontinence by

Figure 1. Drawing of self-help panties that are made to individual measurement.

enclosing and anchoring absorbent padding, and by being waterproof and washable. They open on the side and permit easy and quick management, whether braces are worn or not. They are cut short enough in the crotch to accommodate the bony asymmetries so common in spina bifida, and thus they can fit snugly enough to anchor the desired amount of padding. The plastic is inside, so the panties do not need laundering every time the padding is changed. Also, they do not look like special clothing.

In addition to the diaper situation, further achievements of the entire project are related to enema use; degree of independence in toilet activities; voidings and dry days.

FIFTEEN POINTERS FOR WORKER AND PATIENT

The following fifteen pointers are listed to study and overcome toilet problems:

1. Obtain a detailed bladder and bowel history from patient and/or family.

   A form entitled, "Bladder and Bowel Questionnaire: History of Bladder and Bowel Surgery and Function," is available by writing to Sunnyview Hospital. The purpose of the questionnaire is to obtain a detailed bladder and bowel history from the patient and/or family, in order to establish the schedule the patient should attempt to follow. There are 31 questions, the majority applying to both bladder and bowels. The questions cover essentially the following:

   - Surgery
   - Diet
   - Day's menus
   - Eating or drinking after evening meal
   - Sleeping schedule
   - Age when abnormal function was noticed
   - Degree of control
   - Training
   - Degree of incontinence
   - Retention of bladder
   - Constipation
   - Continent periods
   - Bed-wetting
   - Voidings in ounces
   - Evacuation habits
   - Signals
   - Attention paid to signals
   - Word or method of indication
   - Use of toilet
   - Use of apparatus, such as diapers, urinal, rubber urinal bag, bottle, bedpan
   - Positions assumed for evacuation
   - Agents and/or medications, such as enemas, suppositories, laxatives, drugs
   - Ability to reach toilet or substitute in time
   - Accessibility and convenience of toilet facilities
   - Protective clothing
   - Management of incontinence protection
   - Degree of independence or dependence
   - Appliances worn, such as braces
   - Skin irritation
   - Odor
   - Baths, tub or sponge

2. Obtain organic status of bladder and bowels, as outlined by Dr. Donald Munro

in his book, "The Treatment of Injuries to the Nervous System."

3. Select a 24-hour form to use (there are at least three available: See Bibliography).
4. Ascertain present habits by using form chosen.
5. Devise incontinence protection materials, as it is definitely possible to remain externally dry (there are patterns available).
6. Inventory and evaluate all other clothing and appliances of patient, aiming toward functional, practical clothing, and appliances, which will facilitate rather than hinder toilet activities.
7. Make complete motor evaluation of patient, including daily activity accomplishment, especially as it relates to toilet activities.
8. Set up exercise program on basis of motor evaluation, with special emphasis on functional sitting positions and daily activities related to toilet needs, such as on and off toilet and to and from bathroom.
9. Require that patient be externally dry before initiating the exercise program, and cease to teach exercises if patient becomes otherwise.
10. Alert patient to possibility of developing signals and trying to function in accordance therewith, not attempting for longer than a 20-minute period at one time.
11. Use form chosen to set up schedule for bladder and bowel function.
12. Try bowel routines suggested, aiming to substitute diet, suppositories and regularity for enemas.
13. Teach personal hygiene.
14. Stress exactness, especially in the application of incontinence protection materials.
15. Keep progress records, enlisting patient's aid (inventory forms are available).

CONCLUSION

This has been a report of what took place which, in our judgments, might have affected the toilet activities of seven children. Five out of the seven children benefited. They are more socially acceptable with their plastic-lined self-help panties. Their better toilet habits, skills and activities make life easier and more normal for them. Annette and Jean Irene have greatly improved school situations. For 14½ years, Annette never stood or walked or went to school. Now she travels by bus with her crutches to a public school. In fact, Annette has acquired a bladder capacity and alertness to signals and is independent in all toilet activities. Her dry days are now five out of seven; she has had as many as fourteen dry days in a row. She has no more enemas; her bowels function normally now. Annette stood for the first time in her life on July 30, 1951, at the age of almost 14½ years. She has lost 20 pounds.

She is earnest, helpful, self-sufficient, has a nice personality, made many friends at the Hospital, enjoys parties. She does best at simple concrete and practical tasks, so that vocational planning is toward routine types of jobs.

Jean Irene, approaching 11 years of age, is no longer in the class for cerebral palsied. She will soon attend a special class for orthopedically handicapped children. She is independent in all her toilet activities, including managing her own plastic-lined self-help panties now so designed as to permit easy changing without interference of braces. She has developed a small bladder capacity which makes it possible for her to use the toilet, unless facilities are not easily accessible. She has had as many as seven dry days in a row. Because of attention to signals and diet, no more enemas are given. She has stable and fast crutch gaits, has accomplished all daily activities except traveling, which she will surely learn as she grows older. And, at last Monday becomes the only wash day for her mother, after almost 11 years of wash days every day!

Richard at age 11 now needs no protection, empties his bladder standing in normal fashion every two to four hours, has no more enemas in the bathtub or elsewhere and his bladder and bowels function normally. He has, joined the Hospital's Group Posture Class, goes to the YMCA for gym, swimming and camping activities and pursues his unusual hobby of collecting license plates. With vocational planning and guidance, his future need not be handicapped, as he applies himself in school and keeps up with his grade.

Jeanne Elizabeth at 6 years of age may be too young to respond any faster to bladder and bowel training. Although improvement is evident, her gains so far have come mainly through better designed protective clothing and better bracing to allow sitting positions more conducive to toilet function, as well as to permit easier management of her plastic-lined self-help panties (Figure 2). She may return to the Hospital when she is a little older for more rehabilitation. Jeanne leaves us with more daily activity skills, the basis for a good four-point gait, better protective padding, and all our hopes for a return visit to become more independent some day when she is older.

Courtesy of Eastern New Orthopedic Hospital-School, Inc. (Sunnyview), Schenectady, N.Y.

Figure 2. Jeanne Elizabeth's old braces have been replaced by more functional ones, the left having a knee joint. She is shown wearing her new panties which give her complete protection.

Dolly's bladder problems persist, and so does the ulcer. Since she is only mildly disabled physically, it has been difficult for parents, workers, and teachers to realize that her bladder lapses have a medical basis and happen when there is excitement and lack of toilet facilities at hand, such as in school; they should not be treated as "bad" behavior. Dolly had always resisted diapers. Now that the pattern for the plastic-lined self-help panties, which have helped the others so much, is in the hands of the mother, this is considered a step ahead for Dolly. The plan is for her to wear this protection when at school. Since she is only six, another visit to the Hospital may give us a second chance to help her to extend her dry-day periods, now as many as four at home, into the schoolroom. Dolly did learn to control herself better and left us a happier, better adjusted little girl.

Peter and Robert are so severely handicapped, physically and otherwise, that no active bladder and bowel rehabilitation program has been possible. Their parents are receiving help in custodial management of their children.

It has been possible to teach children how to develop and be alert to signals, to care for their own toilet and special clothing needs and to be fastidious. The lives of five out of seven seriously handicapped children have been favorably changed, so that adulthood may hold for them the fullest measure of happiness.

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DISCUSSION OF PAPER

This is a most worthy study concerning basic needs in the rehabilitation of a small group of handicapped children with diagnosis of spina bifida. The authors with the parents and many others have formulated and tested basic technics which must have added much to the comfort, emotional stability, and personality adjustment of each child mentioned in the study.

Often we are blinded by solvable basic need factors which serve as real handicaps to good treatment procedures. The authors were successful in eliminating these problems by improving toilet habits, skills and activities and by devising plastic-lined, self-help panties.

The May 30th issue of the Journal of the American Medical Association has an interesting article on "The Management of Nocturnal Enuresis by Conditioned Response" by Dr. T. U. Geppert. According to the article, a patient can be conditioned to awaken in response to bladder tension by means of a moisture sensitive pad attached electrically to an alarm clock. Whenever micturition begins, the first few drops of urine moistening the pad makes it conductive for the passage of an electric current which sets off the alarm. The alarm was used only as a tool in developing a conditioned response. This method appeared to be quite successful in the management of nocturnal enuresis in children and the authors may have considered this method as a technic which the length of the paper would not permit mentioning.

The rehabilitation team had an extremely well conceived and thorough way of attacking the problem so that results were measurable.

We are, indeed, indebted to the authors for a well planned practical application of scientific knowledge which is fundamental to progress.

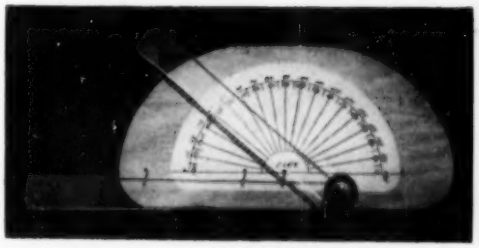
Viola Bryson, Hines, Illinois

Suggestions from the Field

A Simple, Light, Inexpensive

Contact Goniometer

Katherine I. O'Neill



Correct and adequate equipment is of prime importance in treating patients with various disabilities caused by many conditions such as trauma, accidents, and diseases which may result in limitation of range of joint motion. Physical therapists frequently find established procedures inadequate for their needs. Since it sometimes proved difficult to obtain the kind of general purpose goniometer desired, such a need resulted in a referral of the problem to a consulting engineer* who designed two calipers (one for the large joints and another for the small joints), both of which could be used with a single, unattached protractor.

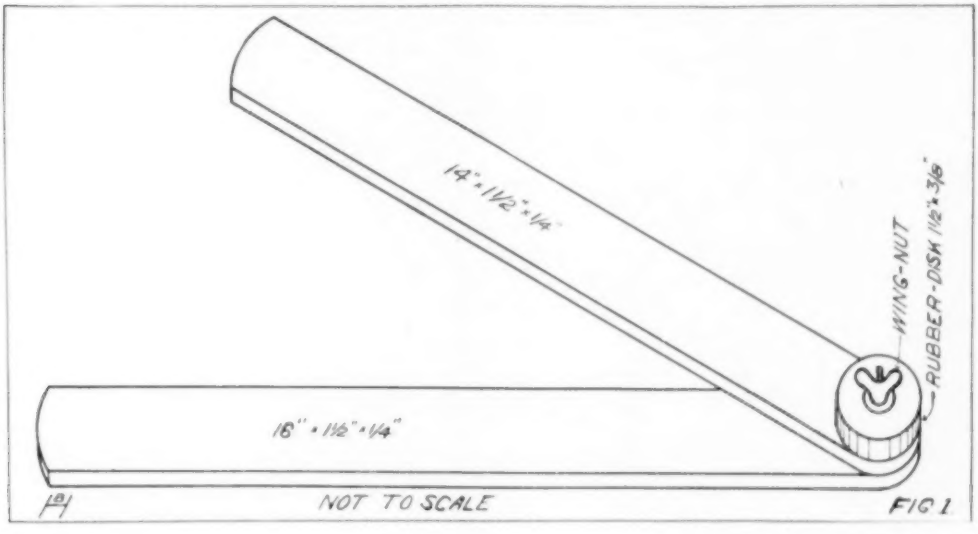
This equipment served two important purposes: one, it enabled accurate measurement of the joints so that the record showed a true picture of the progress of the patient; and two, it served as a stimulus to the patient, motivating him into working a little harder between visits and thus shortening the convalescent period. These appliances were so *light, simple* and *inexpensive* that we believe they may be of interest to others.

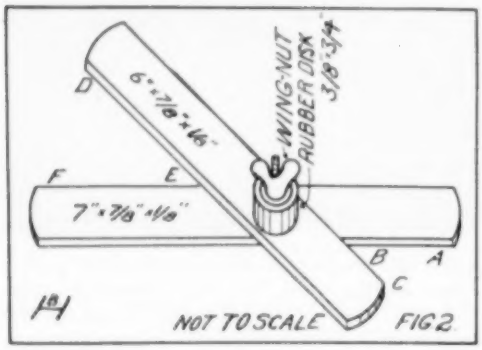
Supervisor, Physical Therapy Department of Instructive Visiting Nurse Association, Baltimore.

* Bancroft Hill, Baltimore, who on numerous occasions has given generously of time and materials to design and construct equipment which proved invaluable to handicapped patients and of great satisfaction to those working with or living with them.

Large Calipers

The large calipers, figure 1, are for measuring such parts as the elbow or the knee. They are made of clear plastic 1½ inches wide and ¼ inch thick. One leg is 16 inches long and the other 14 inches. The joint is made with a bolt ⅛ inch in diameter, 1½ inches long with washers and a wing-nut. Between the wing-nut washer and the plastic legs is a rubber disk 1½ inches in diameter and ⅜ inch thick to maintain the correct tension, which is very important. If a rubber disk is not available, several layers of old innertube will do well enough except for appearances. If desired, a black center line can be drawn down each leg by scratching with a sharp point along a straight edge and filling the line with drawing ink.





SMALL CALIPERS

A pair of small calipers, figure 2, was designed for measuring small joints such as fingers and toes. It is made of clear plastic $\frac{1}{8}$ inch thick and $\frac{7}{8}$ inch wide with the joint construction similar to the large one except the rubber disk is $\frac{3}{4}$ inch in diameter instead of $1\frac{1}{2}$ inches. It is made in the form of an X with legs on one side 4 inches long from the center bolt and on the other side, one 2 inches and the other 3 inches from the center bolt as shown. This was done because the legs of the angle ABC, although suitable for measuring fingers and toes, are too short to conveniently fit the protractor and, as ABC and DEF are always equal, DEF with longer legs may be measured instead.

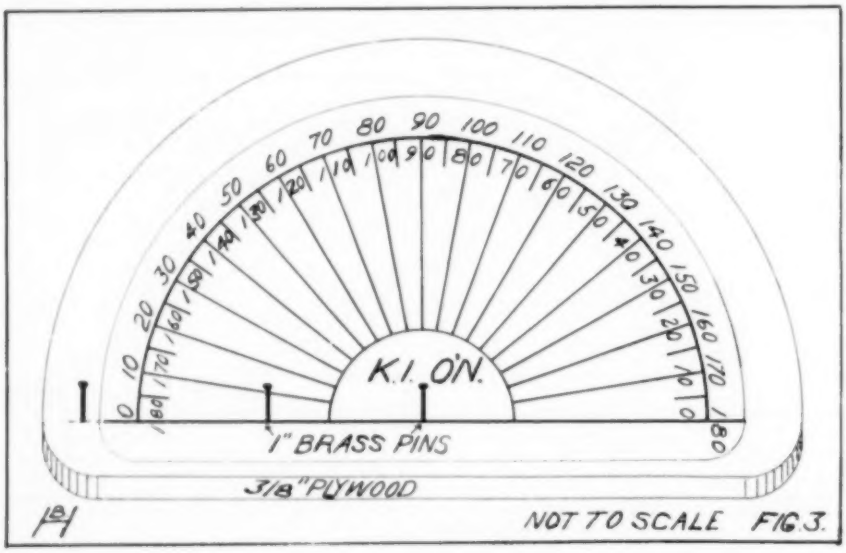
PROTRACTOR

The protractor, figure 3, was made by laying off a semicircle (0 to 180 degrees) 8 inches in diameter on drawing paper and dividing it into five degree intervals with an ordinary celluloid protractor. This was done so numbers could be large and easily read. A limited number of full sized printed copies of this drawing is available on application.

The drawing was glued to a piece of $\frac{3}{8}$ inch ply wood and given two coats of shellac. Each coat when set should be rubbed very lightly with fine sandpaper. A brass pin was placed in the center and two more were placed along the horizontal diameter as shown. They were one inch number 14 brass pins but small finishing nails would do almost as well except for the appearance.

These pins were placed so that the upper edge of the lower leg of the calipers could be placed against them and the calipers moved to the left until the angle came against the center pin and the angle then read. With the five degree divisions it should be possible to read very close to one degree or better than one part in a hundred.

Because the center pin is not a point but has a diameter of about $\frac{1}{16}$ inch, there will be a slight inaccuracy in the readings. This should not cause much variation, and being able to back the calipers against the pins will greatly increase the ease and convenience of operation.



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Editorials

An in-service education program is aimed toward aiding workers to gain efficiency in their present and future work through the development of appropriate habits of thought, action, skills, knowledge, and attitudes. Continued education in any field is a natural and necessary activity of value to each personally as well as to the profession.

During the past few years, no matter what types of personnel problems have appeared important at any one time, the almost universally suggested method of attack has been more and better educational programs. In society generally, it is the great panacea counted upon to perform miracles in many cases. In industry it is called upon to increase the quality and quantity of performance, reduce problems arising out of disciplinary measures, restrict absenteeism, tardiness and stalling, decrease accidents, improve health and interpret policies so cooperation will be greater. In physical therapy many similar results are sought. It has been shown that knowledge usually leads to a greater feeling of security in one's work. Interest is aroused and maintained which offsets boredom and acts as an antidote to provincialism and stereotyping. An analysis or appraisal of work tends to lead to a simplification of work processes which is saving in energy expenditure of the staff. Finally, it is recognized that continued growth and morale go hand in hand.

Everyone will agree that there are many benefits of an in-service education program. Are there any dangers or pitfalls? Let us consider three of them as they apply to physical therapy.

1. Since only the learner can do the learning, a program of in-service education cannot be administered successfully without the interested response and active participation of the persons concerned. Often the staff has a clear idea of its needs. An important way of building up interest is that of giving those involved a voice in the development of the program. It is a widely recognized fact that people think better of an activity when they share in the responsibility and take part in its planning. Any program planned by the physical therapist in charge and/or the physiatrist may not be the great success expected, regardless of the faultlessness of the plan. Are you guilty of putting on a one man show?

2. It is generally accepted that as part of an in-service education program, there should be encouragement for attendance at meetings of local and national professional associations. Also, it is recommended that physical therapists broaden their knowledge and experience by a systematic visitation to neighboring facilities and by the ennrollment in short courses offered in the various specialized areas of physical therapy. It is not enough for the physical therapist in charge to represent her staff in these activities. It is her responsibility to bring the attention of her staff to the meetings and courses and to provide the opportunity, wherever practicable, for members of the staff to attend. This may entail arrangements for time off, procuring ogranizational funds, or merely reducing the amount of red tape involved. While the average physical therapist is eager to increase her own fund of knowledge, all too often the responsibility for sharing the information with her group is overlooked. There are present both an opportunity and an obligation. As physical therapist in charge, have you provided the opportunity for in-service education for

your staff by definite arrangements for the sharing of the newly acquired information? As a participant in or a recipient of a recent meeting or course, have you contributed something of value to your group?

3. There should be no program of in-service education unless it can be justified on the basis of improved performance. During periods when the patient load is slack, intensive in-service education may be the answer to idle hands and minds. Even with the busiest of schedules, with good planning, a minimum of an hour each week can be allotted to the program. Frequently staff members regard the meetings as an imposition on their time, largely because they do not feel the meetings are their own. They tend to resist frequent or unscheduled staff gatherings because patient treatments appear to them to be interrupted, often necessitating last minute shifts in plans. Thus the program may become the source of one more irritation at the end of a long busy day. The physical therapist in charge must use her discretion in scheduling meetings and in making assignments in connection with them, always being certain that patient treatments do not suffer unduly at the expense of in-service education. The wise supervisor will adapt the frequency of meetings to the current workload, will schedule the sessions well in advance along with an announcement of the proposed agenda so that each staff member can do justice both to her patients and to the staff conference. Finally, she will provide sufficient time for the program so that the physical therapists may be prepared for the discussion, attentive and at ease both physically and mentally.

The results of an in-service education program for physical therapy often are remote and indirect. The program may be evaluated in terms of its objectives. With an understanding of the objectives and a desire to participate, the staff will feel, think, and act appropriately as a result. The members of the group will achieve a finer attitude and a deeper regard for the profession, their own organization and for each other. Information will be increased. New skills and technics will be added while the old are reviewed. A carefully planned and executed program of in-service education will help immeasurably in advancing us toward our common goal — improved service to the patients entrusted to our care.

New Scholarship Fund

A scholarship fund of $1,000 for physical therapy students has been set up at the University of Connecticut by the Connecticut Society for Crippled Children and Adults, it is announced today by President A. N. Jorgensen.

The fund, the President said, will be known as the Easter Seal Scholarship Fund and will be used to further interest and education in physical therapy. The scholarships will be distributed through the University Scholarship Committee, to be awarded to either entering students or upper class students eligible for such scholarships.

Gertrude Norcross, executive secretary for the Society said in a letter, "It is not our policy to use Easter Seal funds except for direct service projects of the Society. However, we feel strongly the need for more physical therapists and because of this we are taking the initiative to start such a fund for the University. We are hoping that this will serve as the beginning of a number of similar gifts from other organizations interested in providing physical therapy education."

In disclosing acceptance of the scholarship fund by the University Board of Trustees, the President said that the fund had been voted two weeks ago by the Board of Directors of the Connecticut Society for Crippled Children and Adults which has headquarters in Hartford.

Executive Committee Meets

The Executive Committee of the American Physical Therapy Association met in New York, November 18 to 21. A summary of their decisions will be published in a future issue of the Review.

Association Activities

Amendment to Bylaws

Notice to all members

In June the House of Delegates overwhelmingly approved the motion to consider amending the Bylaws to increase the American Physical Therapy Association dues from $15.00 to $20.00 per year. The action further provided that the amendment be submitted by mail to the delegates prior to the beginning of the fiscal year, May 1, 1954 (see report of the House of Delegates in the November issue of the *Review*). In accordance with the Bylaws that all members be notified of any proposed amendment sixty days prior to action, the amendment to Article III Section 6 is hereby presented:

On or before May 1 of each year the dues noted below shall be forwarded to the Association:

(a) Active members—$20.00
(b) Student members—$2.00 and an additional $4.00 if they subscribe to the official publication of the Association.
(c) Life and Honorary members—No dues
(d) Associate Members—$5.00
(e) Inactive members—$3.00 and an additional $4.00 if they subscribe to the official publication of the Association.

Any member whose dues for that year have not been received by August 1 shall be suspended from membership until such time as the current dues are received. The records of the Association's central office with respect to the payment of dues shall be evidence of the correctness of the facts. The dues of a member elected to membership after October 1 shall for the year of his election be one half the annual dues. The annual dues of an active member shall be allocated as follows: $3.00 to the appropriate component chapter; $5.00 to the Association's official publication; and $12.00 to the national office of the Association. The dues of all other types of members shall be allocated as the Executive Committee may determine.

No changes proposed in the provision for assessments.

Article III Section 6 as it stands is as follows:

Section 6—Dues and Special Assessments—On or before May 1 of the year for which the dues in question are payable, the dues noted below with respect to each class of member shall be forwarded to the Treasurer of the Association:

(a) Active members—$15.00
(b) Life members and Honorary members—No dues
(c) Associate members—$5.00
(d) Inactive members and Student members—$2.00 and an additional $3.00 if they subscribe to the official publication of the Association.

Any member whose dues for that year have not been received by the Treasurer by August 1 shall ipso facto be suspended from membership until such time as the current dues are received. The records of the Association's central office with respect to the payment of dues shall be prima facie evidence of the correctness of the facts stated therein. The dues of a member newly elected to membership after October 1 shall for the year of his election be one-half of the annual dues for a member of this class. The annual dues of an active member shall be payable directly to the Treasurer of this Association and shall be allocated as follows: $2.00 to the appropriate component chapter; $5.00 to the Association's official publication; and $8.00 to the national office of the Association. The dues of all other types of members shall be allocated as the Executive Committee may determine.

A special assessment may be levied on all active members by a vote of two-thirds of the members of the House of Delegates at an annual meeting or by ballot cast by mail. Notice of said proposed assessment shall have been mailed to each active member of the Association thirty days prior to the date for action on the proposed assessment. A special assessment shall be due and payable within sixty days of the vote to assess. Only members whose payment of such special assessment has been received shall be deemed to be in good standing.

The chapters will therefore provide for discussion of this amendment and instruction of their delegates as to vote. Mail ballots will be sent to each chapter secretary in January.

The amendment has the endorsement of the Finance Committee and the Executive Committee for the following reasons:

1. Expenses for operating the National Office have increased along with all costs. Telephone rates, postal rates, office supplies and equipment, salaries, printing have all gone up.
2. As the Association has developed, added responsibilities have required more travel by the staff for contacts and consultations

with other allied national and international organizations and with employing agencies.

3. As chapters and members accept their professional responsibilities they rightly see and recommend expanded projects for the Association to carry out. During the past year special committees have been at work on: revised standards of physical therapy education; the scope of service of the Association's education division; the qualifications for public health personnel; personnel policies for the national office; examinations for licensing physical therapists and admitting foreign trained physical therapists to membership; defining the duties of non-professional personnel. Such committees, all of which are for the good of the profession, incur expenses which strain a very limited budget. Many other problems of concern to the profession which in turn affect the status of each individual in the profession should and must be dealt with in similar manner but cannot be initiated without additional funds.
4. Two-thirds of the services of the National Office are financed from an outside source (grants from the National Foundation for Infantile Paralysis). Should such grants be canceled or reduced the services of the National Office would be proportionately reduced.
5. The Association's reserve fund is not sufficient to maintain even minimum operations of the Association headquarters for a year.
6. Requests for service, guidance, and assistance from chapters and members clearly indicate the need for more personnel to make this available.
7. Operating costs for chapters have increased and require additional financial support.

RECAPITULATION

A raise of $5.00 in American Physical Therapy Association Active Membership dues is requested on the basis of increased cost and minimum requirements for expansion. Not all of the suggestions above can be initiated but it is felt you will wish to maintain our present level of operation and allow for some increase of services.

$12.00 of active membership dues will be allotted to maintenance of National Office services and operation.

5.00 will provide your subscription to the *Physical Therapy Review*.

3.00 will be allotted to the chapter to which you are assigned.

Inactive member — A raise of $1.00 is requested. Fifty cents of this will be allocated to the appropriate chapter.

A raise of $1.00 for the *Review* subscription of active and student members is requested to cover costs.

Any Questions?

This new department is at your request for your service. Get acquainted with your Association by asking questions.

Question —

Are self-employed physical therapists exempt from the Self-Employment Contributions Act?

— A Member

Answer —

The Employment Tax Ruling Branch in the Office the Commissioner of Internal Revenue replied in part as follows:

"It is the general position of this office that only those professions specifically designated in section 481(c)(5), (physician, lawyer, dentist, osteopath, veterinarian, chiropractor, naturopath, optometrist, Christian Science practitioner, architect, certified public accountant under State or municipal law, full-time practicing public accountant, funeral director, or professional engineer; or the performance of such service by a partnership), are excluded from the term "trade or business"; that those designations are to be given their commonly accepted meanings; and that such professional exclusions are applicable only if the individuals concerned meet the legal requirements, if any, for practicing their professions in the place where they perform the services.

As it will be noted physical therapists are not one of the types of drugless practitioners specifically named in section 481 (c) (5) of the Self-Employment Contributions Act. Therefore, it may be stated generally that in those States where physical therapists are licensed as such their services are not within the exclusion".

Question —

Please explain what is meant in the group insurance proposal by the reference to 51% enrollment?

— A Member

Answer —

During the Chapter enrollment period which ended November 15th, policies were issued to all who applied if they were considered good risks. Between November 15th and the time when 51% of the active membership are enrolled applicants must have a physical examination. At such time as 51% of the active members are enrolled all

applicants will be issued policies regardless of risk and with no limitations.

Question —

Are active members on duty with the Armed Forces eligible to be issued policies under the group health and accident insurance plan?

— 1st. Lieutenant

Answer —

As stated in the agreement, those in the military service are excluded from the plan and may not receive a policy until 60 days after their release from service.

Question —

Some of us feel that too much emphasis is being put on recruitment while more help should be given those already in the field in interpreting the profession to allied workers and laymen. It is very hard to convince young people to join the group when the advice they receive from their own physician is vague and doubtful as to its merits.

— A Chapter Member

Answer —

What you say about the need for interpretation is quite true. This has been a continuing program of the Association. For example our national exhibits program, which include exhibiting at the American Medical Association, American Hospital, was for that very purpose. We made the exhibit available to chapters for state medical and hospital meetings. Considerable emphasis to chapters was placed on the need for this sort of public relations program. Many chapters now have an exhibit annually at a State Medical or State Hospital Association meeting showing what physical therapy is and who is a qualified physical therapist. Many have a day or half-day program. Our question and answer sheet was developed for medical and lay education and not for recruitment. Our booklet, A Hospital Physical Therapy Department also falls into that category. It was developed by a joint committee of the American Medical Association, the American Hospital Association and ourselves. It was distributed by the American Hospital Association to every member hospital in the country and we have sent out many more. Through participation nationally in meetings of lay organizations such as the National Foundation for Infantile Paralysis, National Society for Crippled Children and Adults, National Rehabilitation Association and others a great deal has been done in education of the lay person. These past two years we have really emphasized recruitment to chapters. Why — because the demand far exceeded the supply? What created the demand — Could it not be the knowledge on the part of the physician and layman of the value of physical therapy and that it required a qualified physical therapist to do it? To recruit, the profession must be interpreted and sold, not only to the students but to parents, educators, physicians and hospital administrators who may be advisors to these young people. You have probably done a far better job on medical and lay education than you realize. The physician who has been queried by parents and gives a vague answer will become aware of articles in the medical magazines, hospital journals and lay magazines and take an interest in them. His attention has been called to physical therapy. Here in the National office we have, we think, a fairly well balanced program which includes placement services and guidance, consultation services for patient management and in particular the polio patient; education, recruitment, chapter guidance, membership services, liaison with national voluntary and governmental organizations. This includes, medical, hospital and lay groups and last and by no means least the Physical Therapy Review.

Chapter News

Colorado

The Eyes of Texas are Upon You

(A delegate's view of the A.P.T.A. convention.)

There was a big convention in the spring of '53,
And all the P.T. wranglers came ridin in to see.
They donned their hats and chaps and spurs and practiced on their drawl,
And headed for the 'lone star state' with a big "Howdy, you all."
Now Texas, as you dern well know, has the mostest one can mention,
And they really did themselves up proud puttin' on this big convention.
The weather was the hottest that a gal could hope to find,
And the hotel was the coolest of any of its kind.
The biggest little rodeo and red hot Bar-B-Q,
With all the beer that 'one should drink' and Casey Tibbs as the buck-a-roo.
Imbued with the greatest of Texas and carried away, 'win or lose,'
Someone said, "Head office needs money," so we voted to raise all our dues.
Colorado made a proposal, a mighty important one too,
But it met death true Texas style, so fast the sparks just flew.
The lectures were truly terrific with the right inspirational touch,
Designed to revive all the oldies and help in recruitment as such.
The point made by many a speaker was just as plain as could be;
'We no longer treat just an arm or a leg but a personality.'
All in all we learned a lot and had a lot of fun:
But I don't know why they didn't turn off that 'gal dern sun.'

Two New Chapters Formed

During the past few months new chapters of the American Physical Therapy Association have been organized in Nevada and North Dakota. Thus Wyoming is now the only state in which there is no chapter.

These chapters are welcomed as our newest groups and reports from them indicate enthusiastic support in the development of our professional aims.

Chapters will be presented to these chapters at the 1954 meeting of the House of Delegates.

Nevada

President, Eva A. Martin, 7 Arcade, Medico Dental Building, Reno, Nevada

Secretary-Treasurer, Jane Reading, 1445 University Terrace, Reno, Nevada

Other officers are:
Vice President, Garland Smith
Directors, Marion Barfknecht, Margaret Heidrich

North Dakota

President, Mr. Clarence O. Blecha, 1027 Lincoln Drive, Grand Forks, North Dakota

Secretary-Treasurer, Sarah Zimmerman, Physical Therapy Department, St. Michaels Hospital, Grand Forks, North Dakota

Other officers are:
Vice President, Robert Hedgecoke

Cynthia May Mabbette, graduate of the D. T. Watson School of Physiatrics and member of this Association since 1946, passed away October 4, 1953.

Miss Mabbette had been on the staff of the Indiana Division of Services for Crippled Children.

School News

New Student Members

Albany Hospital

Barbara L. Coughlin
Joan Foster
Lucille Grafton
Shirley Hakes
Marjorie Kirkland
Dolores Petersen
Marion Rose
Daphne Williams

University of Buffalo

Jack C. Anthony
Frank J. Caruana
Mildred Coe
Gilbert H. Coffey, Jr.
Joseph Corbelli
Howard Haderer
Reuben Kaiser
Joan Marasi
Frances J. Szymanski

Columbia University

Alice Bond
Mrs. Alice Lee Cooper
Mrs. Lotte Carter
Anne Goodrich
Margery Greenfield
Florence Guest
Judith Kaplan
Julia L. Kelley
Duncan Kennedy
Emma Ligresti
Gretchen Mars
Betty McElroy
Peter Pillone
Lawrence Raymond
Thomas Redden
Harriet Schulman
Deborah Sharek
Joan E. Wesp
Margaret Elizabeth Willett
Phoebe Anne Wolfe

Hermann Hospital

Sue Ann Boehm
Jose Colom
Virginia Brown Edmonson
Julius Alexandra Engel
William F. Guynes, Jr.
Erma J. Kelle
Robert H. Klingler
Hope Elaine Miller
Jenny Roman
Melzer Franklin Rose
Paul M. Southern, Jr.
Gerald W. VanGenderen
Donald Gregory Van Vooren

New York University

Jessie Ellen Abbott
Polly M. Apperson
Frank Edward Arrigo
Vicki Becce
Mrs. Leigh Hildreth Berglund
Matthew Vincent Bracco
Stanley Brason
Stanley Joseph Capone
Theodore Leroy Carson
James Grant Crakes
William DiPace
Harold Glicklin
Elizabeth M. Heuser
Stephen Hucko
Irwin Davis Kupferman
Eleanor Denise Leahy
Joan Phyllis Loewe
Thomas Maniscalco
Martin Margolis
James Francis McClinch
John Bernard McKenna
Corinne A. Mabry
Arthur N. Nelson
Sally Palen
Daniel Gerard Pillone
Dorothy Schattner
Yvonne Vernell Schofield
George Scura
Roslyn Sirlin
Carol Ann Sklar
Barthami Esther Sloan
Clara M. Striso
Ralph Suris
Walter Gilbert Wolf

University of Pennsylvania

Mrs. Jacqueline B. Anderson
Carole Louise Arnot
Robert E. Ayers
Donald A. Boughter
Douglas Boutin
Samuel Brockman
John L. Echternach
Wesley David Fegely
Norma P. Fisher
Alfred E. Fletcher
Inez Joann Geahart
Frederick Robert Knight
Angelo F. LaFuria
Robert R. McIntyre
William Harold Nutt
Ruth Wilson Reed
Roslyn Schlansky
Margaret Jane Wells

D. T. Watson School

Dorothy Bennett Allen
John Douglas Barnhouse
Audrey Gay Dunbar
Jean Louise Fellows
Joanne M. Franz
John James Goshorn
Marylois Beachler
Carlton Bradley
Harry T. Covington
Lillian M. Dugan
Derry Dale Jacobs
Helen M. Joos
Kathleen Kerr
Matina Klepetsani
Robert C. Moran
Julia Marie Nickum
Elmer E. Phelps, Jr.
John Rees
Walter Sarvey
Gloria Dean Sipe
Billie Ruth Stemler
Janet Wanda Vichinsky
Thomas David Winner, Jr.

University of Connecticut
School of Physical Therapy

The University of Connecticut has a rural campus, situated on beautiful rolling hills, providing healthful surroundings conducive to study and to the activities associated with a college campus. Living quarters are provided on campus for students in new modern dormitories.

The School of Physical Therapy meets all essentials established by the Council on Medical Education and Hospitals of the American Medical Association, and graduates are eligible for membership in the American Physical Therapy Association.

Any high school graduate may make application by writing to the Admissions Office of the University. Freshmen and sophomore students may transfer from any other school or university by sending in transcripts of their previous work and making application.

Transfer students may begin their physical therapy work at the beginning of either semester, in September or February, and should plan on at least two years to complete their studies for which they will be given a B.S. degree. This degree is not limited in any way and is also awarded to graduate students who desire to continue their studies in this field, thus giving them a second B.S. degree. There is no certificate course and no one year course.

The University is provided with an active R.O.T.C. program so that young men may plan on being able to finish their education without being subject to draft, and may plan on a commission while serving their term of duty. Korean veterans will find the program set up so they can use their educational benefits.

Dr. John C. Allen, Physiatrist at Hartford Hospital is Medical Director and Dean of the school. Dr. Allen has spent years laying the foundation for a solid, well accredited school. He was in the army as Chief of Physical Therapy at Regional and Convalescent Hospital in Miami, Florida.

Technical Director of the school is Miss Frances Tappan. She has a B.S. in Education from Cortland State Teachers College and her M.A. degree was obtained from Stanford University. She first studied physical therapy at Walter Reed Army Hospital in Washington, D.C., following which she served seventeen months in the Army including overseas duty in the South Pacific.

Assistant Technical Director of the school is Mr. James M. Bauer, a native of Niagara Falls, New York, who received a B.S. degree in physical education at Springfield College in 1947, a physical therapy certificate at Columbia Uni-

versity in 1949, and an M.S. from Springfield College in 1952. He held the office of Legislative Chairman of the Eastern New York Chapter of the American Physical Therapy Association from 1951 to 1952 and served three years with the United States Ski Troops. He will be teaching most of the basic technics.

Instructors for the school are Marilyn Kidder and Julianne Cunningham.

Miss Kidder was born in Medford, Massachusetts and received her B.S. degree in physical therapy from Boston University, College of Physical Education for Women. She served as Physical Therapy Supervisor at the New York Rehabilitation Hospital at West Haverstraw, New York, spent two months on a polio epidemic assignment at Children's Hospital in Oklahoma City, Oklahoma. Miss Kidder's primary interest and responsibility is anatomy.

Miss Cunningham was born in Hartford, Connecticut and received her B.S. in Education from Tufts College in 1947 after having attended the Bouve-Boston School of Physical Education and receiving a certificate in physical therapy. Following this she was employed by the Newington Home and Hospital for Crippled Children at Newington, Connecticut.

Affiliated areas for the school encompass a variety of hospitals including private hospitals, rehabilitation centers, children's hospitals with a well rounded distribution of the type of cases most commonly treated by the physical therapist.

In each affiliated area clinical supervisors work with the instructors from the University to guide the student.

Doctors from the Hartford area teach all courses in Pathology, Medicine, Orthopedics, Neurology, Psychiatry and Surgery. The affiliated staff includes:

Nila Kirkpatrick Covalt, M.D., Associate Professor, Chief of Physical Medicine and Rehabilitation, Rocky Hill

Samuel A. Schuyler, M.D., Assistant Chief of Physical Medicine and Rehabilitation, Rocky Hill

Ronald Beckett, M.D., Assistant Professor

Edward G. Deming, M.D., Assistant Professor

Rembrandt Dunsmore, M.D., Assistant Professor

Walter Jennings, M.D., Assistant Professor

Leonard Lasser, M.D., Assistant Professor

Earl J. Rhoades, M.D., Assistant Professor

Irving Waltman, M.D., Assistant Professor

George A. Wulp, M.D., Assistant Professor

The school is fortunate to have on its teaching staff two physiatrists. In addition to Dr. John Allen there is Dr. Nila Kirkpatrick Covalt, Physiatrist at Rocky Hill, and Dr. Samuel A. Schuyler will be assisting with the teaching program while he is resident in physical medicine at Rocky Hill.

All students interested should write to the School of Physical Therapy, U-101, University of Connecticut, Storrs, Connecticut.

Marriages

Yvonne Kray of New York, N. Y., now Mrs. Yvonne Sokolow, New York, N. Y.

Janet L. Frye of Worcester, Mass., now Mrs. Janet F. Van der Heide, Worcester, Mass.

Lt. Elizabeth U. Campbell of Oakland, Calif., now Mrs. Elizabeth C. Munsee, Concord, Calif.

Barbara Jane Daniel of Kansas City, Mo., to Lt. U. R. Kendree, El Paso, Texas.

Patricia Cope of Alliance, Ohio, now Mrs. Patricia C. Ludwig, Cuyahoga Falls, Ohio.

Barbara Lee of Iowa City, Iowa, to Gerald L. Graham, Fishersville, Va.

Edith Buchwald of New York, N. Y., now Mrs. Edith B. Lawton, New York, N. Y.

Lt. Virginia L. Pace of Maxwell, Ala, to Earl D. Hansen, Moses Lake, Wash.

Shirley A. Scotten of San Diego, Calif., now Mrs. Shirley S. Kendall, San Diego, Calif.

Barbara Anderson of Jacksonville, Fla., to Gelbert M. Brown, Gainesville, Fla.

Capt. Emily Fairbanks of Waltham, Mass., to T. J. O'Connor, Los Angeles, Calif.

Mary Elisabeth Hines of Providence, R. I., to Embree Du Base, Nashville, Tennessee.

Meeting of School Directors

On the recommendation of the Committee to Study the Nature and Functions of the Department of Professional Education of the American Physical Therapy Association, a two-day meeting of physical therapy directors from the approved schools was held at the Edgewater Beach Hotel in Chicago on October 30 and November 1.

Twenty-nine of the thirty-three physical therapy directors of approved schools were present at this meeting to explore the scope of the contribution which the professional organization can make to schools of physical therapy. A generous portion of individual expenses incurred in attending the meeting was provided by the National Foundation for Infantile Paralysis.

During the time allotted for the meeting, physical therapy directors representing the following regions met separately: Eastern, Midwest, and Western. Suggestions made at these meetings were incorporated into the report to the Executive Committee made by the Committee to Study the Nature and Functions of the Department of Professional Education.

Schools of Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
OF THE AMERICAN MEDICAL ASSOCIATION

Graduates of these schools are eligible for membership in the American Physical Therapy Association.

California

School of Physical Therapy
Childrens Hospital Society
4614 Sunset Blvd., Los Angeles 27
(Univ. of California, Los Angeles)

School of Physical Therapy
College of Medical Evangelists
White Memorial Hospital
Boyle & Michigan Aves.
Los Angeles 33

Department of Physical Therapy
University of Southern California
University Park
Los Angeles 7

Curriculum in Physical Therapy
School of Medicine
University of California
3rd & Parnassus
San Francisco 22

Division of Physical Therapy
Stanford University
Stanford

Colorado

School of Physical Therapy
Department of Medicine
University of Colorado
4200 East Ninth Ave.
Denver 7

Connecticut

School of Physical Therapy
University of Connecticut
Box U 101
Storrs

Illinois

School of Physical Therapy
The Medical School, Northwestern University
303 East Chicago Ave.
Chicago 11

Iowa

†Department of Physical Therapy
State University of Iowa
University Hospitals
Iowa City

Kansas

School of Physical Therapy
University of Kansas — Medical Center
Kansas City 3

Louisiana

†Charity Hospital School of Physical Therapy
1532 Tulane Ave.
New Orleans

Massachusetts

*Course in Physical Therapy
Bouve-Boston School
Medford 55
(Tufts College, Medford)

*Program in Physical Therapy
Simmons College
Children's Medical Center
300 Longwood Ave.
Boston 15

Department of Physical Therapy
Boston University
Sargent College
6 Everett St.
Cambridge 38

Michigan

Curriculum in Physical Therapy
Dept. of Physical Medicine & Rehabilitation
University Hospital
University of Michigan
1313 East Ann St.
Ann Arbor

Minnesota

Course in Physical Medicine
The Medical School
University of Minnesota
Minneapolis 14

†School of Physical Therapy
Mayo Clinic
Rochester

Missouri

Department of Physical Therapy
Division of Auxiliary Medical Services
School of Medicine
Washington University
Barnes Hospital
600 S. Kingshighway
St. Louis 10

Division of Health & Hospital Services
St. Louis University School of Nursing
1402 South Grand Blvd.
St. Louis 4

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* Only women accepted.
† Only certificate awarded.

New York

Physical Therapy School
Albany Hospital
New Scotland Ave.
Albany 1
(Russell Sage College, Troy)

Program in Physical Therapy
University of Buffalo
2183 Main St.
Buffalo 14

Division of Physical Therapy
College of Physicians & Surgeons
Columbia University
630 W. 168th St.
New York 32

Curriculum in Physical Therapy
School of Education
New York University
Washington Square
New York 3

North Carolina

Division of Physical Therapy
School of Medicine
Duke University
Durham

Ohio

School of Physical Therapy
The Frank E. Bunts Educational Institute
Euclid & East 93rd St.
Cleveland 6
(Cleveland Clinic)

Pennsylvania

†The D. T. Watson School of Physiatrics
Leetsdale

Division of Physical Therapy
School of Auxiliary Medical Services
University of Pennsylvania
1818 Lombard St.
Philadelphia 46

Texas

†Grady Vaughn School of Physical Therapy
Baylor University Hospital
Dallas 1

†School of Physical Therapy
Hermann Hospital
Houston 5

School of Physical Therapy
The University of Texas — Medical Branch
Galveston

Virginia

Physical Therapy School
Baruch Center of Phys. Med. & Rehabilitation
Medical College of Virginia
Richmond 19
(Richmond Professional Institute)

Wisconsin

Section in Physical Medicine
Medical School
University of Wisconsin
Madison

U. S. Army Medical Service

†* Physical Therapy Course

Medical Field Service School
Brooke Army Medical Center
Fort Sam Houston, Texas and
Brooke, Letterman, and Walter
Reed Army Hospitals

Write to: The Surgeon General
Department of the Army
Washington 25, D. C.
Attention: Personnel Division

* Only women accepted.
† Only certificate awarded.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Our Book Reviewers for December

Elizabeth C. Addoms, Assistant Professor and Curriculum Director, Physical Therapy Division, New York University, New York City.

Edwin B. Augustin, Staff Physical Therapist, Medical College of Virginia Hospital, Richmond.

Grace Louise Barnhart, graduate of the University of Wisconsin, is an inactive member of the American Physical Therapy Association and a resident of Greenburg, Pennslyvania.

C. Murphy Combs, Ph.D., Department of Anatomy, Northwestern University Medical School, Chicago.

Susanne Hirt, Associate Professor of Applied Anatomy, Medical College of Virginia, Richmond.

Henrietta Smith, Staff Physical Therapist, D. T. Watson Home for Crippled Children, Leetsdale, Pennsylvania.

Abstracts

Relation of Recovery of Sensation to Intraspinal Pathways in Injuries of the Spinal Cord.

Lewis J. Pollock, Benjamin Boshes, Meyer Brown, Alex J. Arieff, Isidore Finkelman, Herman Chor, Norman B. Dobin, Eli L. Tigay, Benjamin H. Desert, Richard L. Crouch, Herman Blustein, John R. Finkle, and Stanley W. Pyzik, ARCH. NEURO. & PSYCHIAT., 70:137-150, August 1953.

The authors point out the necessity of clinical studies alone on return of sensation, since the modern treatment of injuries to the spinal cord has brought about a prolonged longevity of life and few opportunities for histological confirmation of clinical observations.

The reasons for failure to determine the form or sequence of spinal cord dermatomes, in contrast to radicular ones, are described.

By means of a study of diagrams showing loss or recovery of sensation of different modalities, the order of sequence of tracts in the lateral and anterior lateral bundles were seen to be those for pressure, touch, pain, cold, and heat. The largest areas of recovery of various modalities, in descending order, were those for touch, pain, cold, and heat.

In a surprisingly large number of cases recovery of sensation presented the sensory picture of that produced by thrombosis of the anterior spinal artery.

When sensation is recovering from above, there is a reluctance for it to intrude into the postaxial surface of the lower extremity, and when sensation is recovering from below, there is an impediment to extension of recovery beyond the postaxial surface of the lower extremity. This suggests a separate representation in the spinal cord for the preaxial and the postaxial surface of the leg. An exception to this is the simultaneous recovery of the dorsum of the trunk, the buttocks, and the sacrum. This suggests a separate representation of the posterior primary division of the spinal nerves.

The simultaneous recovery of sensation in the anterior surface of the thigh and the buttocks suggests that the association of the thigh and the buttocks on the dorsal surface of the limb bud is brought about by various distortions in embryonic life. Attention is called to recovery of sensation in regions, not dermatomes, of extremities, such as the foot, and below the knee, encircling that portion.

Recovery of sensation to the skin of the genitalia occurred when only the upper lumbar segments had recovered, and not the buttocks and sacral segments. It also occurred when the uppermost part of the inner surface of the thigh was recovering and the sacral segments were bereft of sensation. Finally, it occurred with recovery of other sacral segments. These several modes of recovery may be the reason for the high frequency of return of sensation to the genitalia.

Study of Movements of Cutaneous Interstitial Fluids in Human Beings by Means of a Fluorescent Tracer Substance.

Ray W. Gifford, J. Earle Estes, Jr., Charles F. Code, Edward J. Baldes, and Grace M. Roth, J. LAB. & CLIN. MED., 42:299-308, August 1953.

A method has been described for the photometric measurement of the disappearance of a fluorescent tracer substance (riboflavin) after it has been injected intradermally. The disappearance of the fluorescence may be an index of the rate of flow of cutaneous interstitial fluid.

The disappearance of riboflavin after its injection into the skin of the legs of 20 normal persons was studied under basal conditions. The results were compared with those obtained after subjecting the same persons to various experimental conditions designed to alter the flow of tissue fluid.

An increase in the rate of disappearance of riboflavin, considered to indicate increased flow of tissue fluid, was observed in normal persons in a warm environment and after local injections of histamine.

Slow disappearance of riboflavin, considered to indicate a slower rate of flow of tissue fluid, was observed in normal persons in a cold environment, after local injections of epinephrine, and when the limb in which the injection was made was dependent or obstructed by the inflated cuff of a sphygmomanometer.

No significant alterations in the disappearance of riboflavin were observed in the skin of the lower extremities of patients suffering from chronic occlusive arterial disease.

Disappearance of riboflavin was found to be more rapid in the skin of edematous extremities.

Early Function in the Treatment of Fractures of the Upper Extremity.

William K. Massie, KENTUCKY M. J., 51:297-301, 323, July 1953.

A decade ago Clay Ray Murry of New York in setting the ultimate goal of fracture treatment said that fractures should be wished into anatomical alignment and held there by moral suasion while the extremity continued normal function. In the short interim much progress has been made to attain this ideal.

Rigid fixation of long bone fractures by intramedullary pinning and contact plate application utilizes the compression factor in healing, which in the cases presented shortened the clinical healing time as much as 50 per cent. In addition post-traumatic stiffness was prevented by functional use and obviated the need for prolonged rehabilitation. This form of treatment, however, is in the formative stage and should be elected with caution, since a lack of familiarity with the peculiar hazards of intramedullary nailing can produce results which could discredit a method which we feel has real merit.

Cardiac Manifestations of Poliomyelitis.

Max J. Fox, Louis Sennett, and Joseph F. Kuzma, LANCET, CCLXV: 323-324, August 15, 1953.

Poliomyelitis is no longer looked upon as a disease of the central nervous system only. It is now generally accepted that the myocardium may be involved, but the recognition of cardiac lesions is relatively recent, dating from the observations published by Saphir and Wile in 1942. The purpose of the authors is to describe the electrocardiographic findings in 189 cases of poliomyelitis and the pathological appearances of necropsy material from 70 fatal cases of bulbar poliomyelitis.

A total of 412 electrocardiograms were taken on 189 cases of poliomyelitis. Electrocardiographic abnormalities were found in 32 per cent of the patients. The most consistent abnormality was in the ST-T. The data presented conform, in the main, with those reported by other investigators.

A review of 70 autopsied cases of poliomyelitis revealed interstitial inflammatory reactions in about half of the cases.

Because of the nonspecific charac-

teristics of the E.C.G. findings, the diagnosis of myocarditis complicating poliomyelitis remains a clinical problem, in which the electrocardiogram serves as a supplement. The possibility of selective "cardiotropism" by individual strains of the virus is commented upon.

Pulmonary Function in Rheumatic Heart Disease and Its Relation to Exertional Dyspnea in Ambulatory Patients.

John R. West, Harry A. Bliss, John A. Wood, and Dickinson W. Richards, CIRCULATION, VIII:178-187, August 1953.

Twenty-one patients with rheumatic heart disease and varying degrees of diminished cardiac reserve have been studied with respect to pulmonary and cardio-circulatory function. Eighteen of these were ambulatory persons who presented no clinical signs of right ventricular failure or pulmonary edema despite the presence, in some instances, of advanced hemodynamic abnormalities secondary to heart disease. Three others had chronic pulmonary disease in addition to heart disease, but also, were not in congestive failure.

Although deviating slightly from normal in several respects the pattern of pulmonary function of the 18 patients without pulmonary disease or congestive failure does not account for the extertional dyspnea which these patients have. It suggests, rather, that dyspnea on exertion at the stage of cardiac insufficiency exemplified by this group of patients is a complex matter with multiple facets. Of these, weakness and easily induced fatigue of skeletal musculature, including the muscles of respiration, are possibly directly related to inadequacy of cardiac output, while increased pulmonary vascular pressures may result in an increased effort in breathing as well as some form of subjective distress secondary to vascular distention per se.

In the absence of fluid retention, that is, of pulmonary edema, hydrothorax or other evidences of this abnormality, or specific disease of the lungs, the presence of even severe degrees of pulmonary vascular engorgement may not result in appreciable alterations in the lung volumes, maximum breathing capacity, and gross ventilatory response to mild exercise.

Intrinsic pulmonary disease, when it occurs concomitantly with compensated rheumatic heart disease, induces alterations in lung functions which may as a rule be readily differentiated from those due to heart disease alone.

Lumbosacral Junction in Patients with and without Backache.

Clarence Splithoff, J.A.M.A., 152: 1610-1613, August 22, 1933.

In order to determine the relationship between roentgenographic findings and chronic lumbar backache, a study was made comparing 100 patients with backaches and an equal number of persons not so affected. The 100 normal person were unselected and were at least 40 years of age, they had never consulted a physician or been disabled by chronic backache.

The study demonstrated that the findings or roentgenograms of the lumbosacral region of normal persons and of those with backaches are quite similar. Congenital anomalies and other anatomic details appear in close numerical sequence. Degenerative changes are somewhat more frequent in patients with backache, and the sacral angles are slightly less in this group. There is no significant difference in the width of either anterior or posterior disc measurement.

The fact that the findings in both groups so closely parallel each other does not discount the importance of routine roentographic study, according to the author, since many factors other than bone structure play a part.

Cerebral Circulation and Metabolism in Pulmonary Emphysema and Fibrosis with Observations on the Effects of Mild Exercise.

P. Scheinberg, I. Blackburn, M. Saslaw, M. Rich, and G. Baum, J. CLIN. INVESTIGATION, XXXII:720-728, August 1953.

Cerebral blood flow, oxygen consumption, and vascular resistance were measured in 22 patients with chronic pulmonary disease of moderate functional severity, and compared with a group of normal controls of the same average age. The effects of mild exercise were studied in 12 of the patients.

There was no significant difference in cerebral blood flow as measured by the intermittent sampling technic in 13 of these subjects as compared to the continuous sampling technic in the remaining nine subjects.

Mean values for cerebral blood flow, cerebral A-V O_2 difference, cerebral oxygen consumption, and cerebral vascular resistance did not differ significantly from the normal control subjects.

The correlation between cerebral blood flow and arterial pCO_2 was good, whereas no correlation was found between cerebral blood flow and arterial pO_2 or per cent arterial O_2 saturation.

The effects of exercise on cerebral metabolic functions in these patients were variable and without a significant trend. A reduction in arterial pH during exercise did not influence cerebral blood flow.

These studies reemphasize the important relationship between arterial pCO_2 and cerebral blood flow and demonstrate the relative unimportance of the clinical and spirometric severity classification on cerebral blood flow in chronic pulmonary disease.

Continuous Immobilization of Joints in Rheumatoid Arthritis.

Michael Kelly, M. J. Australia, II: 95-99, July 18, 1953.

In rheumatoid arthritis the most crippling deformities are those affecting the hands, wrists and knees; if these can be prevented the patient will be able to lead a useful life. Deformity and ankylosis are the end-results of a pathological condition which is perpetuated and intensified by repeated movements.

When joints are acutely painful and swollen, continuous immobilization in plaster of Paris for three to five weeks relieves the pain immediately and causes the swelling to subside. The joints are splinted so as to allow use of the limb and movements of the unaffected joints, and active contraction of the muscles is practised continuously. Rest in bed is not recommended.

On removal of the plaster splint the involved joints are splinted intermittently, and restoration of movement is gradual. There is no danger of ankylosis. A number of joints may be immobilized at once, with a remarkable improvement in the patient's general health. The principle of continuous immobilization is in conformity with traditional orthopaedic principles.

Studies in Neuromuscular Diseases with Radioactive Potassium.

William H. Blahd, Franz K. Bauer, Raymond L. Libby, and Augustus S. Rose, NEUROLOGY, 3:604-608, August 1953.

Frequent observations of the profound muscle weakness associated with potassium depletion following diabetic coma, and the striking effects of potassium administration in certain cases of familial periodic paralysis emphasize its important role in normal muscle function. Recent work by Cannon has shown the essential nature of potassium in the synthesis of muscle protein and the failure of this tissue to develop in depleted animals. Furthermore, the inability of muscle to phosphorylate creatine in the absence of potassium has been known for some time and is another indication of its fundamental importance in muscle metabolism.

The determination of serum potassium in the various neuromuscular diseases has been of no help to the clinician or the investigator, for the values obtained have been almost uniformly within the normal range. Since 95 per cent of the body potassium is intracellular, it is evident that in most instances serum values do not adequately reflect intracellular derangements of potassium metabolism.

In this study, an attempt was made to investigate the distribution and metabolism of potassium in various neuromuscular diseases using radioactive K^{42}. The isotope dilution technic was used to determine total body exchangeable potassium.

The results indicate a marked diminution of the exchangeable potassium in muscular dystrophy and myotonia atrophica, actually preceding the development of significant clinical findings in several cases.

Action Potentials in Muscular Atrophy of Neurogenic Origin.

Fritz Buchthal, and Paolo Pinelli, NEUROLOGY, 3:591-603, August 1953.

Duration, shape and amplitude of muscle action potentials recorded during voluntary effort have been studied in 67 cases of muscular atrophy of neurogenic origin.

In most cases (60 per cent) with atrophies caused by involvement of the anterior horn cells there was an increase in both mean duration and amplitude of the action potentials. This increase was the more pronounced the more advanced was the stage of the disease, and there was a significant increase in all cases with marked atrophy. A correlation was found in these cases between the mean duration of action potentials and the degree of synchronization of action potentials from different motor units. In view of this finding, it seemed possible that a slight temporal dispersion of nearly coincident discharges from different subunits might account for the increase in duration of the action potentials in spinal atrophy. This view is consistent with the finding of an increased action potential amplitude in these cases.

In atrophies caused by peripheral nerve lesions, a statistically significant increase in mean duration was found in 16 of 34 cases and was generally associated with normal mean amplitude of action potentials. The presence of an increase in mean duration was not correlated with the severity or the duration of the disease, nor were the cases with normal action potential parameters different in any way from those with alterations. Possible explanations for the increased duration and the normal or decreased amplitude of muscle action potentials in peripheral nerve lesions are discussed. It seems most plausible to assume an increase in temporal dispersion of the activation of fibers within the same subunit, due to changes in end plate delay or impulse propagation over the muscle fiber.

Post-Traumatic Neuroses.

John D. Moriarty, INDUST. MED. & SURG., 22: 337-340, August 1953.

Post-traumatic neurosis may follow an injury to any part of the body, but the great majority are related to head injuries. This is partly due to the special symbolic significance of the head, from the standpoint of the patient's unconscious mind, and is partly due to the concomitant occurrence of the post-concussion syndrome. The latter, which is not a neurosis and which has an anatomicophysiological basis related to the "commotio cerebri," commonly comprises headaches, dizzy spells, and various disturbances in cerebral function. These must be distinguished from neurotic symptoms, but also their persistence may form a nucleus around which neurotic symptoms crystallize.

Post-traumatic neuroses may be classified as: terror and anxiety reactions, neurasthenic and hypochondriacal states, conversion hysterias, and reactions in which social and compensation factors prevail. Pretraumatic personality factors are important, but sometimes no prior neurotic predisposition can be delineated.

Criteria for differentiation of malingering are offered. Also the problem of determination of the degree of relationship between injury and neurosis is discussed.

Principles of treatment of post-traumatic neuroses are briefly surveyed. Psychotherapy of an appropriate type is important, of course, but chemical adjuvants such as narcosynthesis and carbon dioxide inhalation therapy are particularly helpful. More active management of postconcussion symptoms may help prevent development of neurosis. A more scientific attitude on the part of employers and insurance carriers is urged, along with more prompt negotiation and settlement of claims.

Occlusive Dressing Versus Exposure Method in Treatment of Thermal Burns.

Hamilton Baxter, Robert G. Randall, and K. K. Kapur, CANAD. M.A.J., 69: 97-102, August 1953.

The current race in production of atomic weapons suggests that, at some future date, thousands of burn casualties may be anticipated following atomic explosions. Since approximately 50 to 60 per cent of all casualties resulting from such an explosion will receive thermal injuries, it is of considerable importance to investigate the results obtained by methods of treatment of burns which would be economical of both material and personnel.

Results of the exposure method were compared with the occlusive pressure method of treating thermal burns. A total of 45 cases was analyzed. It was found that in both major and minor burns the length of hospitalization was shorter and fewer patients required skin grafting, when treated by the exposure method.

The period of elevated temperature was decreased in major burns and the amount of blood and plasma transfused was reduced. The open-air method when indicated is ideal for treatment of patients with burns who are hospitalized. Development of certain new modifications may permit this method to be used successfully in the management of

mass casualties. Due to less infection, edema, and maceration there appears to be less formation of hypertrophic scar tissue after healing of the burns.

A Balanced Concept of Child Training with Social Implications.

Frederic T. Zimmerman, and Bessie B. Burgemeister, A. J. PSYCHIAT., 110: 143-154, August 1953.

This paper represents a crystallization of the authors' experience in the training and management of children. It is presented in the hope of stimulating a reexamination of accepted tenets of child training and education in the light of scientific evidence, both in the animal and human fields. The authors approach this subject from the viewpoint of the biologist, psychologist, and physician, and not the professional educator, although the goals are identical.

They have presented a balanced concept of child training based on their observations of the dynamics of life in the retarded-child family and the known data of animal experimentation. Since the preservation of a culture depends on the efficacy of transmission of its ideals through its children, they have attempted to explore the possible sociological implications connected with child training.

Twenty Per Cent Carbon Dioxide Inhalation in Muscular Rigidity.

Temple Fay, J.A.M.A., 152:1623-1626, August 22, 1953.

A brief survey of the basis for the use of a mixture of 20 per cent carbon dioxide and 80 per cent oxygen as a diagnostic and therapeutic measure in certain types of rigidity and dystonic disorders is presented, including presently known values of the procedures and contraindications for its use.

It has been observed that brief inhalation of a mixture of 20 per cent carbon dioxide and 80 per cent oxygen in patients manifesting true rigidity produces prompt neuromuscular relaxation and changes in movement facility. This is believed to be due to a better metabolic adjustment to carbon dioxide and is a phenomena often seen in patients during sleep. In the awakened state, chronic hyperventilation and carbon dioxide lack result in effects on the original lesion which become apparent as in coordinated movement, tremor, and hypertonic rigid muscular states. It is believed that sustained alteration is possible in patients in whom the inhalation test has shown that relaxation may be obtained, and maintenance therapy is given to correct the carbon dioxide deficiency.

There are important contraindications to the use of this procedure. In patients in whom relaxation does not occur during the observed "sleeping period" or a response is not observed during the inhalation test, the further use will be of little value. When favorable test responses occur, prompt active physical therapy measures should be taken. The presence of thoracic, cardiac, or cerebral disease must be ruled out before the test is administered.

The author feels judgment of the value of the procedure must rest on more clinical experience and further neurophysiological analysis.

Effect of Denervation of Thermal Cutaneous Receptors on Rectal Temperature Response to Limb Immersion.

Allen Hemingway, and Lyle A. French, A. J. PHYSIOL., 174:264-268, August 1953.

In physiological studies of temperature regulation of warm blooded animals it has been shown that two controlling mechanisms function. One of these is in the "central control" in which physiological activities (namely panting or sweating, cutaneous vasomotor activity and shivering) controlling body temperature are activated or inhibited by changes in the temperature of the brain. The other type of control is "reflex" or "peripheral" control in which thermal cutaneous receptors when stimulated initiate reflexes to control heat transfer from (and heat production by) the body.

In order to determine the role of cutaneous warmth receptors in the control of body temperature, rectal temperatures of dogs have been recorded during a leg-immersion testing procedure. Normal trained unanesthetized dogs suspended in a Pavlov hammock in a cool room of 15-18°C have their hind legs immersed first in cold water, 15-18°, then in warm water at 45° and finally in cold water. Immersion of the hind legs in warm water invokes cutaneous vasodilatation indicated by a rise above 30°C of the skin temperature of the ear while cutaneous vasoconstriction is indicated by a low skin temperature. The test was repeated on the same dogs after bilateral sectioning of the dorsal roots of the spinal nerves to the hind legs, thus denervating the cutaneous warmth receptors of the hind legs. The response of the rectal temperature to the test is markedly changed by the bilateral rhizotomy, and the thermal cutaneous vasomotor response is considerably retarded illustrating the role of reflex temperature control on an animal with intact central control but impaired reflex control of body temperature.

Influence of Evaporative Forces Upon Skin Temperature Dependency of Human Perspiration.

Craig L. Taylor, and Konrad Buettner, J. APPLIED PHYSIOL., 6: 113-123, August 1953.

Water losses from the human skin constitute the major resources of body temperature regulation in warm and hot environments. The detailed nature of these loss mechanisms and their modes of control, however, are incompletely known. It is the purpose of this paper to present evidence for the effects of evaporative factors upon the skin temperature specific water loss from original observations and literature date, and to discuss the possible mechanism of these effects.

Charts of skin water losses against average skin temperature, using experimental results from human exposures to combined conditions of heat, humidity, wind and low air pressure, reveal that significant residual variation is associated with these environmental influences. Since the direction and magnitude of these influences are such as to increase or decrease evaporation from the skin, the phenomenon has been designated as the "evaporative effect." This effect cannot be explained in terms of conventional theory, which assumes that a skin temperature change is intermediary to any skin water loss response to changed environmental evaporative influences.

The basic evidence for the evaporative effect has been derived from four experimental series, variously engaged in by the authors. These sets of data cover the pertinent variables and confirm the generality of the phenomenon. In addition, ample corroboration of the wind and

humidity influences has been found by analyzing data from the literature.

Explanation for the evaporative effect has been sought in skin water transfers not involving active sweat gland participation. This directs attention to the known processes of diffusion (insensible) losses and skin water storage shifts, and to the much less completely understood processes of penetration, repenetration and osmotic regulation in the human skin. Evidence for each has been analyzed, indicating that further investigation of these processes may reveal the mechanism of the evaporative effect.

Differential Diagnosis of Poliomyelitis.

Clifford Grulee, J.A.M.A., 152:1587-1590, August 22, 1953.

According to the author, the commonest problem faced by the physician, with respect to the diagnosis of poliomyelitis, is a differentiation of nonparalytic or atypical types of poliomyelitis from other infections of the central nervous system.

Examination of paired serums during the acute and convalescent course may be important. Lumbar puncture can be of help when a real diagnostic problem exists, but is not necessary with typical clinical features.

Flu-like illnesses and "poliophobia," or illness cause by fear of the disease, must be excluded.

Fluid and Electrolyte Balance in Burns.

Capt. Eric Reiss, Lieut. Jerry A. Stirman, Major Curtis P. Artz, Capt. Johns H. Davis, Col. William H. Anaspacher, J.A.M.A., 152:1309-1313, August 1, 1953.

A severe, untreated burn causes death by starting a large and rapid shift of fluids. Present day therapy in burns and other conditions associated with fluid derangements is based on the assumption that fluids should be administered at the same rate and in the same volume and composition in which they are lost.

The authors state that although the rate of fluid losses can be gaged with some accuracy, the exact composition of fluid losses is yet unknown.

Fluid and electrolyte redistribution is characterized clinically by fever and tachycardia and occurs at the time when the serum sodium level decreases. Burns involving 20 per cent or less of the body surface can be managed with oral administration of electrolyte solutions, supplemented by small quantities of electrolytes, intravenously. In severe burns, 0.5 cc of colloid and 1.5 cc of electrolyte per 1/100 of body surface burns per kilograms of body weight and an additional 1,000 to 2,000 cc of an electrolyte solution of water are used.

After 48 hours, clinical signs and symptoms govern fluid therapy. Because of high losses of urinary potassium, administration of oral potassium begins on the third day.

Follow-up Study in Seventy-Five Cases of Non-Paralytic Poliomyelitis.

E. Moskowitz, and L. I. Kaplan, J.A.M.A., 152: 1505-1506, August 15, 1953.

A greater number of so-called nonparalytic cases have been detected through early diagnosis and hospitalization. Nonparalytic poliomyelitis, as interpreted in this study, refers to cases diagnosed by clinical and laboratory findings in which the patients, at the time of discharge from the hospital, showed no evidence of muscular weakness. During follow-up examination of these patients, a surprising number showed various sequelae.

Of 75 patients with nonparalytic poliomyelitis examined one and one-half to six years after the onset of the illness, 38.6 per cent were found to have minimal weakness in one or more muscle groups. Seven (24.1 per cent) of these patients had symptoms referable to site of muscular weakness. Increased general fatigability was experienced by 42.7 per cent, and 24 per cent had evidences of emotional disturbances, such as irritability, instability, and stuttering.

The authors feel the diagnosis of nonparalytic poliomyelitis should be made following a complete muscle test after the patient has resumed his normal physical activity level. The average hospital stay of patients with nonparalytic poliomyelitis can be reduced if patient is free of spasm and has had multiple screenings for muscular weakness.

Venous Return During Intermittent Positive-Negative Pressure Respiration Studied with a New Catheter Flowmeter.

Gerhard A. Brecher, A. J. PHYSIOL., 174:299-303, August 1953.

It is a common clinical observation that intermittent positive atmospheric-pressure lung inflation has a detrimental effect upon the circulation, particularly if the subject does not have a normal circulatory reserve. Among other possible deleterious effects, this type of respiration diminishes venous return and as a result of this, cardiac output decreases. Thus cardiac output may be reduced by as much as 30 per cent when measured by the Stewart method in closed chest anesthetised dogs.

Interest has, therefore, been focused on the question whether or not, in the closed chest, the interposition of periods of negative pressure between positive-pressure lung inflations can improve the circulation. Venous return was recorded with a Pitôt-type differential flowmeter passed as a catheter via jugular vein into the superior vena cava of anesthetized dogs, whose chests remained unopened. Direct measurement of volume flow in the superior cava demonstrated that application of intermittent positive-negative pressure respiration increases venous return significantly over that existing during intermittent positive-atmospheric pressure respiration.

International Congress on Rheumatic Diseases

The proceedings of the Eighth International Congress, which was held in Geneva, Switzerland, September, 1953, may be obtained from *Médecine et Hygiène*, 15 Boul. des Philosophes, Geneva, Switzerland. Price 25 Swiss Francs.

Book Reviews . . . . .

Living With A Disability By *Howard A. Rusk, M.D., and Eugene Taylor. Cloth; Price $3.50. Pp. 191; illus. 282. The Blakiston Co., Inc., Garden City, New York, 1953.*

This book is one of the first of its kind written for the physically handicapped and their families to present instructions on devices used to overcome problems that arise in the home, at work or at play. It is certainly a wonderful book for any handicapped person. This reviewer, who is handicapped, found many devices which would be helpful to her personally.

The illustrations numbering more than 275 give clear details on the many aids described. All handicapped persons will find this book a tremendous help in adjusting to the problems of everyday life. Physical therapists and instructors of the handicapped will find it of great value in their work.

The following are just a few of the many devices described and illustrated in this book: 1) eating utensils, 2) personal hygiene aids, 3) house plans for wheel chair patients, 4) driving attachments for use on automobiles, 5) devices for using telephones and typewriters, 6) various types of wheel chairs and accessories, 7) aids for dressing one's self, 8) housekeeping aids, 9) devices for working in a workshop, and many others.

Dr. Rusk is world known for his work in rehabilitation of the handicapped and is the Director of the Institute of Physical Medicine and Rehabilitation, New York University — Bellevue Medical Center. Mr. Taylor is an assistant professor of clinical physical medicine and rehabilitation at the Institute of Physical Medicine.

Morris' Human Anatomy. *Edited by J. Parsons Schaeffer, A.M., M.D., Ph.D., Sc.D., D. Litt., Professor of Anatomy and Director of the Daniel Baugh Institute of Anatomy, Emeritus, The Jefferson Medical College. New Eleventh Edition. Cloth; price $16.00. Pp. 1,718; illus. 1,220. The Blakiston Company, New York, 1953.*

To those who are familiar with Morris' Human Anatomy, the eleventh edition brings a number of welcome changes and additions. The text has been brought up to date not only in factual material but also in approach to the subject matter.

Emphasis is placed on close correlation with related sciences and on functional and living aspects of anatomy. Embriological explanations and illustrations included throughout the chapters contribute greatly to the understanding of presented anatomical facts. More clinical aspects are added, though not consistently, throughout the book. The bibliographies following each chapter are brought up to date and outstanding investigators, classic and modern, are referred to at appropriate places.

The physical therapist will find that the functional discussions of the musculator and the articulations are more complete than is usually the case in standard text books.

The book may serve as a highly useful reference for graduate students and instructors in anatomy and allied fields. It is, however, not equally well suited for the undergraduate student or the student in physical therapy. Illustrations and drawings, in general, lack clarity and color. In order to keep this enlarged edition at a minimum size the editors, apparently, had to sacrifice the quality of paper and the standard size of the print. These last factors make the book impractical for regular classroom or laboratory use.

The Anatomy of the Nervous System, Its Development and Function *by Stephen Walter Ranson, M.D., Ph.D., Late Professor of Neurology and Director of the Neurological Institute, Northwestern University Medical School, Chicago; and revised by Sam Lillard Clark, M.D., Ph.D., Professor of Anatomy, The Vanderbilt University School of Medicine, Nashville. Ninth Edition. Cloth cover; price $8.50. Pp. 581; illus. 434, 18 in color; W. B. Saunders Company, Philadelphia and London, 1953.*

Dr. Clark's most recent revision of this classic textbook fulfills Professor Ranson's wish that the anatomy of the nervous system be presented "from the dynamic rather than the static point of view." Throughout the text emphasis is placed on the developmental and functional significance of neural structure.

Comparison with earlier editions indicates that the general outline adopted previously has been retained. The principal changes have been the addition to the text of recent advancements in neuroanatomy and neurophysiology, along with 17 new illustrations and diagrams. Examples of the replete review of recent literature are discussions of cerebral angiography, surgery of the autonomic nervous system, surgical leukotomy, central facilitation and inhibition, cortical suppressor areas, and the significance of the brain stem reticular formation. Modifications of former functional interpretations are included in considerations of the spinal cord, modern concepts of cerebellar function, and newer recent hypotheses of thalamic physiology.

The text begins with a brief summary of invertebrate and vertebrate nervous system phylogeny. Detailed descriptions of the brain of the dogfish and an outline of human ontogenetic development are also included. Consideration of the gross anatomy of the nervous system affords a good introduction to a study of the CNS. The chapter on the meningeal coverings and vascular supply of central nervous structures does not adequately detail the circulation of brain stem and spinal cord. Following the histogenesis of the nervous system is a section concerning "neurons and neuroglia," which includes considerations of nerve degeneration, the significance of the neuron doctrine, and recent interpretations of self-exciting closed neuron circuits. The chapter on spinal nerves amply covers the histology and physiology of peripheral sensory endings but does not have a complete presentation of the peripheral components of the nervous system. Nor is the section on the autonomic nervous system as informative as present knowledge would allow. The microscopic anatomy of the spinal cord is not as fully presented as one would like, but the following chapter on fiber tracts of the spinal cord is excellent.

The internal morphology of the brain stem is then undertaken in ascending sequence through the medulla, pons, and mesencephalon. One chapter is devoted to the principle of nerve components and a description of the cranial nerves and their nuclei; this chapter is concluded with a brief summary of these 12 nerves. The section on the cerebellum lists the more recent con-

tributions to its anatomy and physiology and includes a discussion of nystagmus and its mechanism. The complex anatomy of the diencephalon is clearly presented along with a discussion of the activating influence of the thalamic reticular system. The excellent description of hypothalamic physiology makes this chapter on the diencephalon one of the most useful in this text. This reviewer believes that the chapter on "Internal Structure of the Cerebral Hemispheres" gives an inadequate description of the basal ganglia and their connections, although the subsequent chapter on the rhinencephalon is brilliantly done. A section devoted to the cerebral cortex discusses cerebral localization, suppressor areas, aphasias, and symbolization. Current hypotheses of central pathways for suprasegmental facilitation and inhibition of motor activities are included. A summary chapter affords diagrams of the great afferent and efferent systems, as well as a consideration of the brain stem reticular formation's role in motor and awakening activity. A final chapter presents the fundamentals of the more important somatic and visceral reflex arcs, such as those regulating blood pressure, respiration, and various vital functions.

Appended to the text proper is a full chapter entitled "Clinical Illustrations," which offers an excellent selection of case histories indicating the intrinsic relationship between morphology and both normal and pathophysiology of the nervous system. An atlas of 81 drawings and photographs of both Weigert and Nissl sections in transverse, oblique, horizontal, frontal, and sagittal sections of the brain of man accompanied by individual descriptions affords visualization of the central fiber tracts and cell groups. A few figures of the sheep's brain are included as well. The text is concluded by a laboratory outline of neuroanatomy which progresses from a study of the central nervous systems of the dogfish and the fetal pig to a consideration of biological stains for nervous tissue and finally to a laboratory workup of the human nervous system. The bibliography, which contains over 600 anatomical and physiological references, is complete through 1950.

The accepted organization, the recent revision incorporating so many of the current thoughts on central nervous system morphology and function, the abundance of diagrams and plates, the excellent atlas and bibliography, the cross-indexed appendix, and the typographical appeal of this volume make it a highly desirable reference text to the medical profession, as well as a popular textbook for medical students. The facility of its use does make it an important reference adjunct to one who has had some amount of fundamental introduction to the nervous system, and it is in this capacity that this reviewer recommends this time-honored text to members of the ancillary professions.

It's Your Hospital and Your Life.

By Lucy Freeman. Public Affairs Pamphlet No. 187. Single copies $.25. Pp. 32. Public Affairs Committee, Inc., 22 East 38 Street, New York 16, N. Y.

The public will be grateful for this clear picture of the role in its life played by that revered institution, the American hospital.

Following a brief review of the developmental history of voluntary, proprietary, and governmental hospitals in this country, the pamphlet proceeds to discuss the essentials of a good hospital, including the aspects of staff and facilities, professional and technical training programs, medical care and business operations. The reader is treated to an easily understandable presentation of hospital costs in relation to services rendered under the modern "full punch" plan of patient management.

The complexity of hospital organization as a self-contained community is very interestingly portrayed in spite of a few statements (such as, "Your hospital is a hotel where you get 24 hours of personal attention") that might cause some recent patients to raise a questioning eyebrow.

The author covers the subject of hospital approval and accreditation briefly but adequately for the layman, and wisely accents the point that it is the responsibility of the citizens of our towns and cities to raise hospital standards.

The evolvement of hospitals as health centers with emphasis on *prevention* of illness, as well as on diagnosis, treatment, and research, is described as an indication of future trends. An outline of other relatively new hospital functions includes mention of home-care projects, general psychiatric attention, rooming-in arrangements following child birth, preventive medicine plus "family-doctor" service for occupants of low cost housing developments, and total rehabilitation programs aimed at full realization of the physical, mental, social, and vocational potentialities of every patient.

The booklet closes with an orientation of the reader to hospital administration and a discussion of possible solutions to some pressing financial problems of the voluntary hospitals. Stress is laid on the obligation of individual men and women for support of their community health-protecting and health-restoring institutions.

It's Your Hospital and Your Life, by Lucy Freeman, is highly recommended to all physical therapists, and especially to students in the early stages of their professional education.

Dictionary of Games. Outdoor, Covered Court, Gymnasium, Indoor: How to play 458 Games. *By J. B. Pick. Cloth; price $4.75. Pp. 318. Philosophical Library, New York, 1952.*

This book is not a dictionary in the true sense — meaning an account of all games ever played anywhere — but a collection of varied games that anyone, experienced or not, could use to entertain a group of children or adults. The author gives a brief, but concise resume of what he believes are the best competitive games played in Great Britain. He has not given the reader a mass of confusing details and rules, but a swift cartoon of each game. A brief historical summary is given as well as an account of the rules and methods and information as to where to obtain full official regulations on the formal, competitive games. In writing this book it seems that the author wished to convey to the reader that it is not necessary to know all the rules and variations for a group of people to play a game for enjoyment and relaxation. The author has presented a witty concept of each game which is easy and enjoyable to read as well as to play.

The book is divided into four main sections — Outdoor Games; Covered Court Games; Gymnasium Games; and Indoor Games. The formal outdoor games consist mainly of sports such as baseball, rugby, football, golf, field hockey, and croquet. The informal outdoor games include various simple ball games which could be used in modification by handicapped groups. The covered court games are for the more energetic player who might like to play badminton, ice hockey, table tennis, etc.

The indoor ball games which are included in the gymnasium section can be adapted more or less for use for any age group or handicapped group. Card games are enjoyed by all types of people and can be used in any situation.

In reviewing this book consideration was given as to its usefulness to a physical therapist working with a group of cerebral palsy or poliomyelitis patients. Out of the 458 games listed, the reviewer believes that approximately 200 could be adapted with some imagination on the part of the therapist for use with handicapped children or adults. Very few of the gymnasium games require much more equipment than a volley ball or a tennis ball. There are some games that can be adapted to teach patients, as a group, functional activities; such as, moving along the floor from place to place, getting up and down from a chair, walking training, and hand manipulation. There might be many occasions where a game could assist the therapist to teach a difficult functional activity to an indifferent group of patients. If a book with a limited, but well selected, group of games is desirable, this dictionary of games would be an asset to most physical therapy departments.

The Conception of Disease. By *Walter Riese, M.D., Assistant Professor of History of Medicine and of Psychiatry and Neurology, Medical College of Virginia; Department of Mental Hygiene and Hospitals of the Commonwealth of Virginia; Richmond Professional Institute; College of William and Mary; Washington School of Psychiatry. Cloth binding; price $3.75. Pp. 120. Philosophical Library, New York, 1953.*

"The Greek interpretation of disease as a discord or lack of harmony reappeared time and again in the history of medical doctrines; it is not foreign to contemporary authors." Here we are dealing with the concept of disease and health as written by the masters, Plato, Hippocrates, da Vinci, Galen, etc. and the effects of their respective historical periods on present day diagnostic technics of the physician. The author presents interpretations, evaluations, and the limitations of their writings.

Although an intimate understanding of medical history and philosophy is demonstrated by the author, to this reviewer too many complex ideas are presented in too little space. It was found to be an exceedingly difficult book to interpret without a formal background in philosophical writing.

This book would be of little or no value to the clinician with a limited back-ground in philosophy; however, for those who would be interested in various origins and interpretations of philosophical concepts pertaining to disease, this book could be an excellent starting point.

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Physical Therapy Association.

Statement of the Ownership, Management, and Circulation Required by the Act of Congress of August 24, 1912, as Amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233).

Of THE PHYSICAL THERAPY REVIEW, published monthly at New York, N. Y. for October 1, 1953.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: American Physical Therapy Assn., 1790 Broadway, Room 1316, New York 19, N. Y.

Editor: E. Jane Carlin, 1790 Broadway, Room 1316, New York 19, N. Y.

Managing Editor: Carol Vance, 1790 Broadway, Room 1316, New York 19, N. Y.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

Carol Vance, MANAGING EDITOR

Sworn to and subscribed before me this 28th day of September 1953.

Helen Lipshie

[Seal] NOTARY PUBLIC, State of New York
My commission expires March 30, 1954

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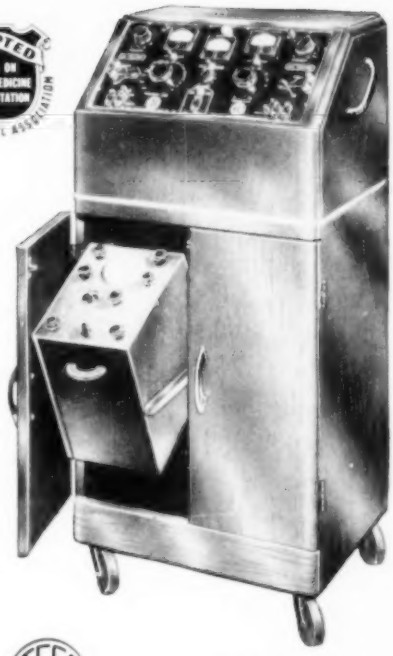

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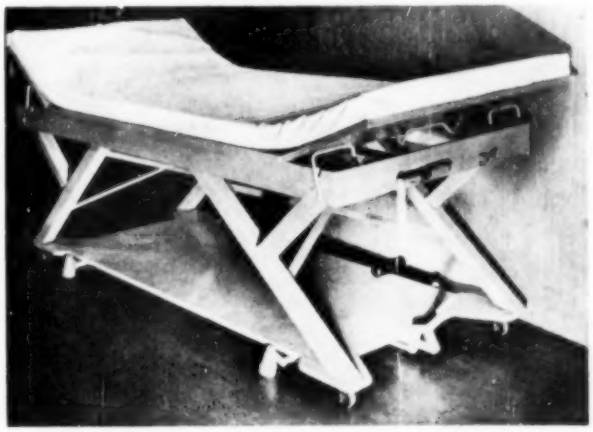

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